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J. A. C. Burnand joined the Company in 1946 and later read economics and accounting at the London School of Economics. Has been Midland Region commercial research manager since April 1962. Enjoys watching cricket from the bar at Edgbaston, golf, and learning from mistakes made on the Stock Exchange.

Geoffrey Campey was born and bred in Chester and graduated in mathematics at King's College, London, in 1958. He joined the Company in 1960 and went to work at the Digital Computer Section, Wilton, where his present responsibilities include the provision of courses for Divisional staff in the application of computing techniques and the development of new applications for digital computers.

Lewis A. Inglis, of the Central Personnel Department and one of the three assistant personnel managers of ICI, is retiring from the Company at the end of the month after 37 years' service. He joined Nobel Industries Ltd. in August 1926 just before the ICI merger and, apart from an initial few months in the Accounts Department of Nobel Industries Ltd., he has worked on staff matters ever since.

A. D. C. Peterson is director of the Department of Education at Oxford University. Educated at Radley and Balliol College, Oxford, he became first a management trainee, then a schoolmaster at Shrewsbury. During the war he served in the Far East, eventually becoming deputy director of Psychological Warfare, SEAC. Since the war he has been successively headmaster of Adams' Grammar School, Shropshire, director-general of Information Services in Malaya, headmaster of Dover College and, since 1958, director of Oxford University's Department of Education.

John Lewes Sayer joined Plastics Division's Development Department in October 1962 and is currently working on the development of packaging machinery using 'Propathene' film. Originally studied medicine at London University and followed this with a year on the Continent studying art and political culture. In his spare time he is writing a novel and preparing an exhibition of paintings.

A. Q. Tollit joined Nobel Chemical Finishes Ltd., the forerunner of Paints Division, as publicity manager in 1926 and transferred to the newly formed Pharmaceuticals Division in the same capacity in 1942. Was appointed an assistant publicity controller in Central Publicity Department in 1956 and is responsible for publicity services to the Divisions.

Front cover: *Abu Simbel. Detail of the tomb of Rameses III, two hundred feet below ground.*

Why it pays to advertise *by A. Q. Tollit*

In his address to the National Productivity Year Conference last September, the Chairman emphasised the important part good marketing plays in achieving high productivity. Of advertising in particular he said:

> "It is no good having the right products properly packed if the people who might use them are ignorant of their existence or merits. A lot of nonsense is talked today about the waste of resources in advertising, but in my view first-class advertising plays a vital role in industrial productivity. That role is of increasing importance where new products are being developed and come on to the market, and skilful advertising as well as the demonstration of new products are essential if we are to get the maximum use out of the manufacturing equipment used."

Advertising is not an isolated activity but an essential part of the manufacturing/marketing process, and therefore it can only be planned effectively if it is clear from the start what purpose it is to serve. The uses and advantages of some products are readily understood, and advertising can be expected to contribute directly to their sales; but in the industrial field many products are sold to other manufacturers and form part of their own manufacturing process. (Most of the often quoted total of 12,000 products on the Company's selling range are sold in bulk to other manufacturers, and only a few, such as paints, 'Terylene,' some pharmaceutical products, 'Lightning' fasteners and Plant Protection garden products are to be found in the shops.) Where a product in itself does not offer any readily apparent advantages to the user, but where it may have, as it were, concealed

PHILIP JONES-GRIFFITHS

advantages in the way it is produced, or in the way in which it is packed, its stability in storage, or in the mere convenience of being able to obtain supplies from a local depot, it will not be easy to convince a potential customer by advertising alone. Such products are usually bought only after discussion with the representative or as the result of visits to the customer's factory by technical service representatives, or by providing samples for trial. In these circumstances, the purpose of advertising is not to make a direct sale but to inform possible buyers of the availability of the product and to encourage enquiries for further information in the form of literature or a call from a representative.

The method of making it known to potential customers that a product is available which might be of interest to them will depend on a number of factors. For instance, if there are only a few hundred firms to approach, it might be possible to call on them individually, and publicity support limited to providing the representatives with explanatory and technical literature. If there are insufficient representatives to call on potential customers in reasonable time the most economical means of approach may be through the post, by direct mailing. If there are a large number of potential customers, press advertising is likely to be the answer. But in which journals or newspapers? There are a large number from which to choose, particularly if the product is of interest to manufacturers in a number of different industries. It would be expensive and wasteful to advertise in all the journals alleged to circulate within these industries, and a choice has to be made based on experience and information about the circulation and readership of the journals. Other forms of advertising must also be considered—literature, exhibitions, samples, direct mail, and perhaps films to demonstrate the correct use of the product.

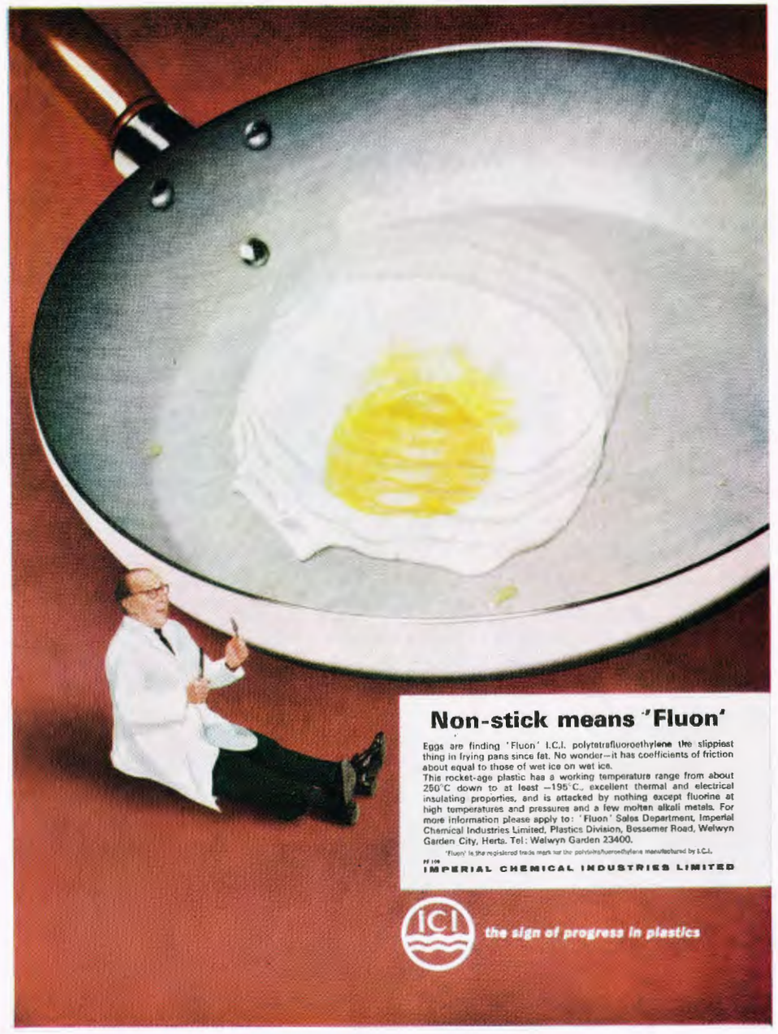
A guide as to the amount of money which might be available for publicity will be given by the estimate of sales and profits for the first two or three years.

Although most of the Company's products are advertised and sold to industry, the greatest expenditure on advertising is actually incurred by those few Divisions which have products to be found in the shops. Now the cost of advertising space in all publications is geared to the circulation of these publications. In other words, the more opportunities the publication offers for the advertisement to be seen by prospective purchasers, the greater the cost of the space they provide. The circulations of the trade and technical journals are measured in thousands. Circulations of national newspapers, however, are measured in millions, and advertising costs are proportionately much greater, though cost per thousand circulation may well be less. To give a concrete example, a page in a trade or technical journal may cost £30–£60 and the circulation be 5000. A page in the *Daily Express* costs £6000, but the circulation is 4½ million, and the cost therefore per possible reader is actually less in the *Express* than in the trade journal.

Over the last ten years Paints Division have become the biggest single suppliers of paint to the retail trade, and this result could never have been achieved without heavy advertising. When the Division decided to enter the retail field itself it was recognised that there might be objections from the merchants and decorators to whom the sale of 'Dulux' and other paints had previously been confined. This was a ticklish problem and was solved very largely by an advertising slogan—"Say 'Dulux' to your Decorator." This phrase was used widely on posters, bus sides, railway stations and elsewhere, and had the great merit of serving two purposes. The decorator could not take exception to it—indeed, it was in his support—but it also suggested to those who did their own painting that they should buy 'Dulux,' the paint used by the professional. It is fair to say that in fact the decorating trade were quick to recognise that the "do it yourself" movement was developing rapidly and that for ICI to refrain from entering the retail market would in no way prevent this development or further prejudice their own business.

Front or back cover advertisement for trade journals

Nobel Division advertisement for clothing and textiles trade journals



Reproduction of an outside cover advertisement for various rubber and plastics trade papers

To introduce a new synthetic fibre into the textile trade is an even bigger problem. The trade has a complicated organisational structure, in which spinners, weavers, dyers, finishers and garment makers are involved. Before goods containing 'Terylene' could reach the stores and shops all these elements of the trade had to be convinced that the new fibre would be satisfactory from the point of view of their own production procedures. It must be capable of being spun, woven, dyed, made up, etc., and of producing a finished article offering some benefit to the public which would show it to be a better alternative to what was already available.

On the Company's side, heavy capital expenditure had to be incurred on building an entirely new kind of plant, and it was vitally important that it should be worked at near capacity as quickly as possible if the price of the product was to be kept at a competitive level which would also yield a reasonable return on capital. The first need therefore was to shorten the interval before the product would appear as finished goods in the shops. The problem was solved by the Company advertising widely at the right time that certain finished articles such as suits, trousers, shirts, skirts, socks, ties, etc., embodying 'Terylene' would be appearing in the shops. The fact that ICI was able to promise advertising support was effective in obtaining the co-operation of the trade and resulted in some 'Terylene' goods being available to the public a great deal more quickly than otherwise would have been possible.

Plastics Division had a rather similar problem in the early days of polythene, and it was solved in much the same way. Many people may recall the advertising for 'Alkathene' houseware in the press and magazines and for a short period on buses.

Another interesting example of the use of advertising, but on a smaller scale, was

Right: Billingham Division advertisement for chemical trade journals
Far right: General Chemicals Division advertisement for use in refrigeration journals
Below: Example of an advertisement introducing a new product to potential customers

the success of the Salt Sales Department of Alkali Division in changing the buying habits of public authority surveyors. Only a few years ago, orders for ground rock salt for snow clearing were concentrated in the last quarter of the year. This not only created a difficulty in finding space to accommodate enormous stocks, but also created a problem in the delivery of thousands of tons of salt all over the country at short notice and possibly in bad weather conditions. Often customers were embarrassed because supplies could not reach them in time. Now, ICI's ground rock salt can, in fact, be safely stored in the open. It creates its own "thatch" which prevents rain from penetrating the heap and causing caking. An advertising campaign was therefore conducted in the journals read by surveyors and the like, pointing out that by omitting to place orders earlier in the year local authorities and others could well find themselves without supplies just when most needed. The storage properties of ground rock salt were emphasised, and because stocks would not deteriorate it was suggested that bigger stocks should be held. Over a period of three or four years this campaign was so successful that orders for salt for snow clearing are now placed in the spring and early summer by more than half the surveyors in this country, and the total sales of salt for this purpose have increased from 20,800 tons in 1957 to an estimated 750,000 tons in 1963.

Advertising may thus play a number of different roles in a marketing operation and its use has become something of a science, but it can never be an exact science because it involves people, and people's reactions are not uniform or readily predictable in any given set of circumstances. Advertising then is rather more an art than a craft, but by making use of available information about channels of communication, and by using modern research and other marketing techniques, a lot of the guesswork can be avoided and its practitioners may justly regard themselves as skilled craftsmen fully worthy of their—often expensive—hire.

by J. A. C. Burnand

ICI and the Motor Industry

The history of motor car manufacture is a success story, due to the ability of the industry to perfect techniques of mass production which have brought cheap motoring to the general public. It is true to say that car prices have risen less in recent years than the cost of living or the prices of manufactured goods generally. Since motor manufacturers are primarily concerned with car assembly, using components made by many specialist firms, these components represent the most important element of their costs, which, on estimate, may be roughly sub-divided as follows:

Materials	70%
Labour	10%
Overheads (depreciation, etc.)	20%

The suppliers of materials may, therefore, claim to have played a large part in the success of the industry, not only by their efforts to keep costs down, which they have achieved by continuous research and development, but also by improving the efficiency of the components which they supply. For example, a 'Vynide' leathercloth of 1963 is cheaper than a comparable cloth of 1953 and prices for equivalent car finishes have not shown any significant increase during this period.

An important market for ICI products

The motor industry provides an important market for ICI materials and our association goes back nearly 40 years. Nowadays almost all ICI Divisions supply products directly or indirectly to the motor manufacturers and there are few parts in any car which are not made or processed with materials supplied in one form or another by ICI. In 1963 our sales to the motor manufacturers and their suppliers were worth roughly £13½m, mostly for the production of passenger cars. Approximately half this figure is represented by leathercloth and paints; other less noticeable parts of a car also provide very important applications for our products. Many involve several Divisions; pigments and phthalic anhydride from Dyestuffs Division, butanol from HOC, and pentaerythritol from Nobel, are used in the manufacture of paints by Paints Division, for example.

ICI (Hyde)'s service to the motor industry has been concentrated on the continuous improvement of the quality of coated fabrics, on promoting replacement of traditional materials and on the development of products for use with new cost-saving production techniques, such as high frequency welding, which eliminates stitching. This has been achieved by close technical co-operation with car stylists and engineers.

Leather, for car upholstery, presents a problem to the mass producers; every

The seats in this BMC "Mini" are covered in 'Vynide' supplied by ICI (Hyde) Ltd.

hide is different in size and shape and requires skilled individual cutting. Thus the introduction in 1928 of 'Rexine', a man-made nitrocellulose coated fabric, in constant width and uniform finish, enabling patterns to be cut from 50 or more layers simultaneously, was of great assistance. 'Rexine' is excellent for all panelling work, due to its high resistance to surface abrasion. The successful development after the war of 'Vynide,' which employs pvc in place of nitrocellulose, provided the additional ability to withstand continual flexing, and 'Vynide' soon became established as an all-purpose trim material. It is now used for upholstery, general panelling work and for easily cleaned roof linings.

More recently, a new technique of expanding the coating by means of a foamed pvc layer has led to Hyde's new luxury product, 'Ambla'. In place of woven cloth a knitted fabric is used, with the result that 'Ambla' is supple, easily manipulated as an upholstery covering and capable of being welded or stitched into soft, extremely comfortable yet hard-wearing seat trim.

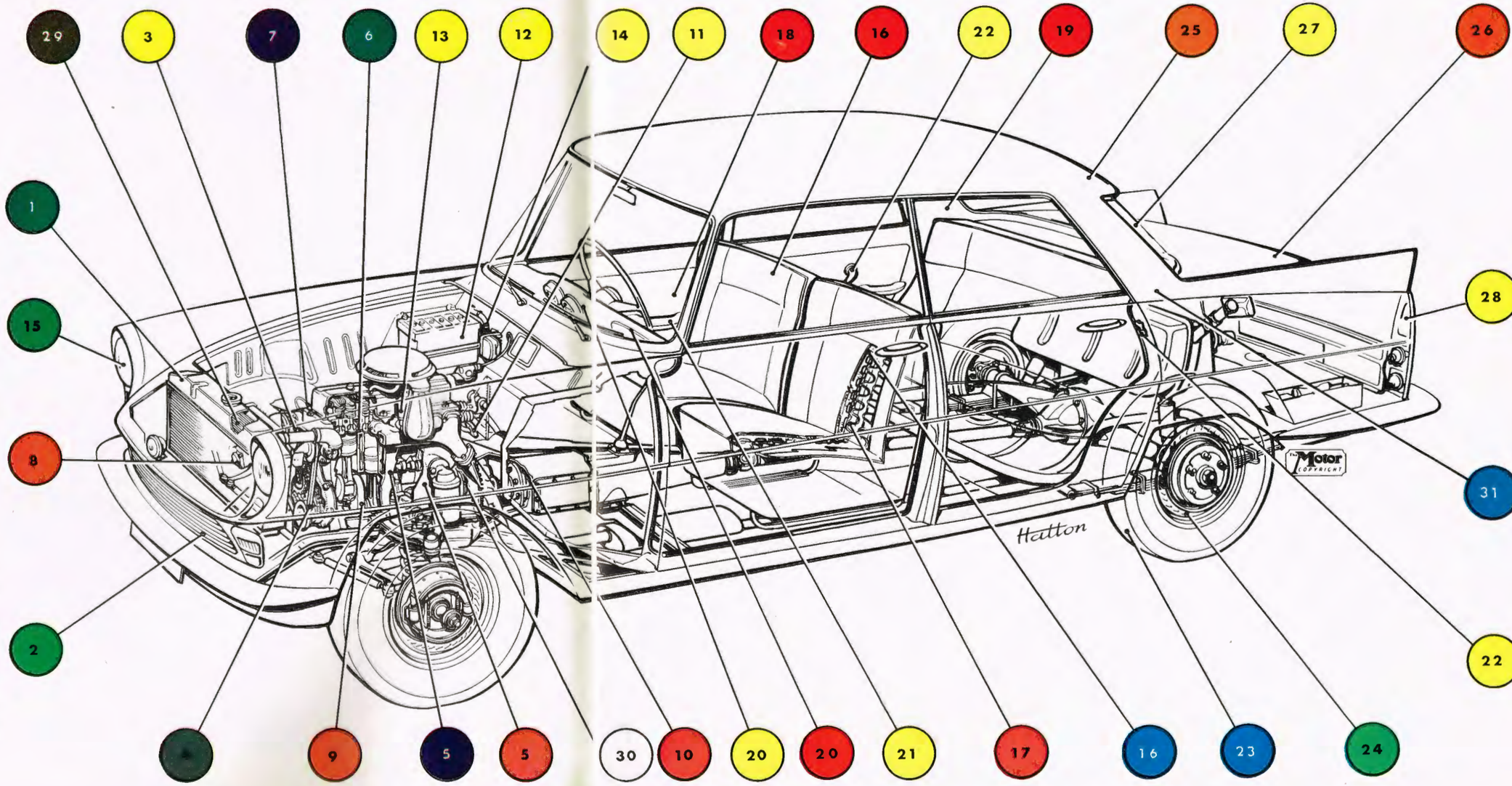
New manufacturing techniques

Probably the most important new process for manufacturing trim components is known as vacuum forming. This is a quick and very effective method of covering complex shapes. ICI 'Vulkide' sheet is designed for this process and can be heated, shaped and cooled, without losing its attractive finish. Finished formings may be partly filled with plastic foam to provide resilient fascia pads and crash rolls. It is estimated that two out of three British cars include Hyde's products in their interior trim.

Until the late 1930s, when Briggs Bodies (now absorbed by Ford) adopted stoving synthetic finishes in place of nitrocellulose, motor manufacturers' paint processes were lengthy and expensive in both material and labour. The advent of stoving synthetics enabled far more solids to be sprayed on cars and conferred an initial gloss which no cellulose finish of the time could do. Thus, in one stroke, was achieved an enormous saving in time and effort, and in consequence a major expansion of output capacity in existing paint shops. These synthetic finishes were "straight" alkyd, and provided the platform on which more sophisticated synthetics were built.

This drawing of a typical modern car shows some of the many items supplied directly or indirectly by ICI

No. and colour code	Component	Manufacturing Division	Material
1 Dark green	Radiator	IMI(K)	Copper/brass
2 Light green	Radiator grille	Impalco	Aluminium
3 Yellow	Radiator fan	Plastics	Polypropylene
4 Grey	Fan belt	Fibres	Polyester fibre
5 Mauve	Cylinder block	Billingham	Carbon dioxide
5 Pink	Cylinder block	Mond	Silicate of soda
6 Dark green	Cylinder head gaskets	IMI(K)	Copper
7 Mauve	Sparking plug	Billingham	Atmospheres derived from anhydrous ammonia
8	Steering	Mond	Metal degreasing and Heat treatment
9 Pink	Engine components	Mond	Metal degreasing and Heat treatment
10	Gearbox components	Mond	Metal degreasing and Heat treatment
11 Yellow	Accelerator pedal	Plastics	Polypropylene
12 Yellow	Battery	Plastics	pvc separators
13 Yellow	Carburetter floats	Plastics	Nylon
14 Yellow	Electrical wiring	Plastics	pvc
15 Dark green	Headlamp rims/reflectors	IMI(K)	Brass
16 Red	Seats	ICI (Hyde)	Leathercloth
16 Blue	Seats	Dyestuffs	Flexible foams
17 Pink	Seat springs	Mond	Solution of synthetic resin
18 Red	Car door panels	ICI (Hyde)	Leathercloth
19 Red	Headlinings	ICI (Hyde)	Leathercloth
20 Red	Fascia panels	ICI (Hyde)	ABS
20 Yellow	Glove boxes	Plastics	Polypropylene
21 Yellow	Arm rest	Plastics	pvc
22 Yellow	Door handles	Plastics	Nylon
23 Blue	Tyres	Dyestuffs	Rubber chemicals
24 Light green	Wheel discs	Impalco	Aluminium
25 Orange	Body shell	Paints	Metal pretreatment
26 Orange	Paint	Paints	Full painting system
27 Yellow	Rear window	Plastics	Acrylic
28 Yellow	Rear lights and reflectors	Plastics	Acrylic
29 Brown	Anti-freeze for radiators and cooling systems	HOC	Ethylene glycol
30 White	Rear crankshaft seal	Nobel	Silicone rubber
31 Blue	Paint	Dyestuffs	Pigments



Morris 1100 motor cars on the assembly line

Among the advances achieved in this respect were the halving of stoving schedules, the great improvement in gloss retention brought about by the introduction of melamine modifications, and, by 1960, the development of metallic finishes of high initial lustre and with gloss retention virtually equalling that of full colours.

The only obvious shortcoming in the stoving synthetic finishes currently used is that they cannot be sanded and polished to remove dirt and surface defects, without disfiguring the film. Acrylic resins now entering the field promise to meet this deficiency without sacrifice of the desirable qualities of the alkyds.

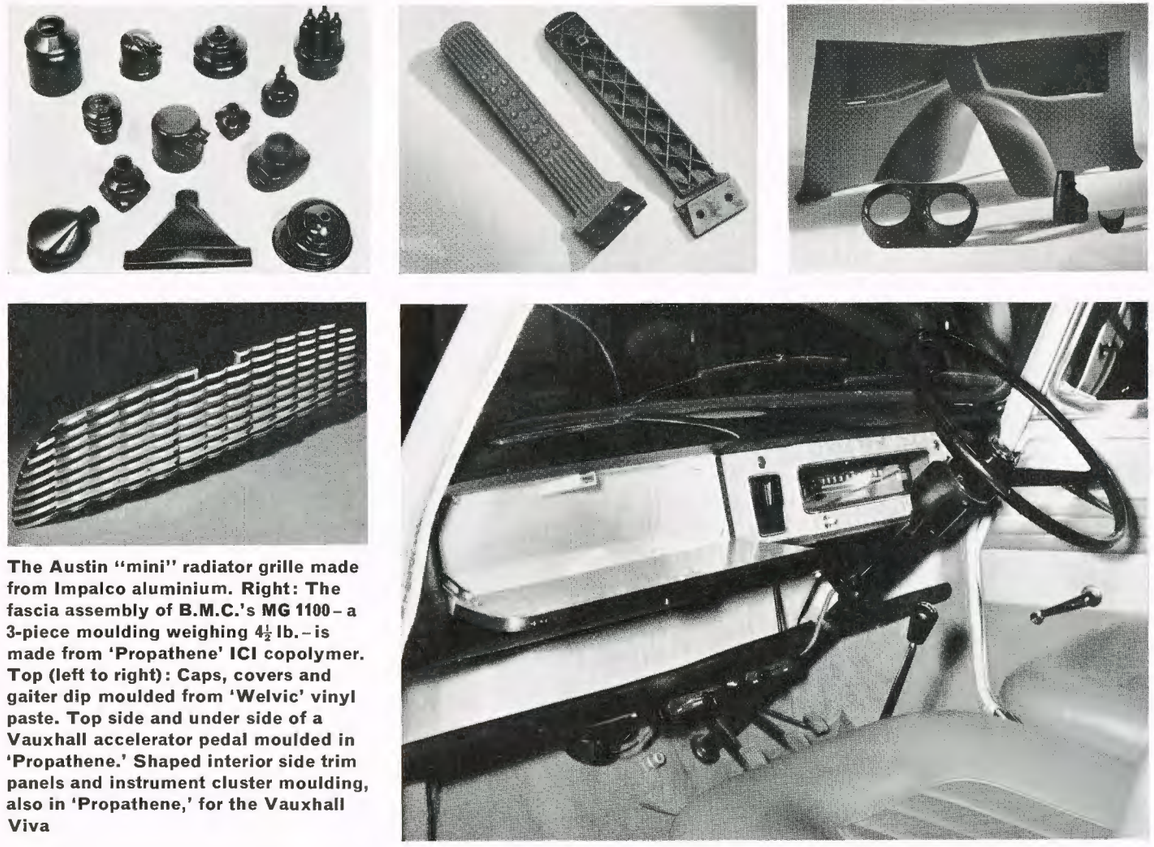
In all these developments of colour coats, Paints Division has played a dominant part in this country.

The provision of pre-treatments and undercoats, which are highly resistant to metal corrosion, is a basic necessity regardless of what finishing coats are used, and in this field also Paints Division have been prominent. In the late 1940s, the Division collaborated in the development of the unique "Roto-dip" priming technique, which is still in use throughout the British Motor Corporation.

In 1963 Paints Division, in conjunction with the Pressed Steel Company, were the first to announce a production process for painting car bodies and components by electrodeposition of a water-thinned paint. This fully automatic process, known as Electrocoat, constitutes a major advance in improving corrosion resistance and also eliminates some of the wastage usually associated with dipping processes. Paints Division has also been a leader in the development of water-thinned undercoats for conventional dip or spray application, the most impressive of these being the water-thinned Roto-dip primer, which is being used successfully by BMC.

Problems facing the motor manufacturer

On average about 25 lb. of plastics materials are now used per car, mostly for flexible foams and leathercloths. The motor industry has to face world-wide markets and this has led to a number of problems concerned with the rigidity and temperature resistance of plastics. Plastics Division has devoted much effort towards solving these problems and has collaborated very closely both with stylists and design engineers in the development of new plastics components. 'Diakon' acrylic moulding powder has been in use for a number of years for rear light covers, reflectors and insignia; 'Maranyl' nylon is also fairly widely employed for small non-stressed bearings and gear wheels. 'Fluon' polytetrafluoroethylene is now being investigated by automotive engineers for applications involving the use of non-lubricated bearings in automatic drive assemblies and for components, where its remarkably low coefficient of friction can be exploited. Some of the largest plastics mouldings are made in 'Propathene' polypropylene, which is used for interior side panels, glove boxes and shelves and complete car fascias. The side panels measure 20 in. × 26 in. yet weigh less than 2 lb. and the glove boxes 21 in. × 12½ in. weigh 44 oz. The new acetal moulding material, 'Alkon,' promises to have an important future in motor car manufacture because of its unique combination of engineering design properties. It is tough, resilient and rigid without being brittle, retaining these



The Austin "mini" radiator grille made from Impalco aluminium. Right: The fascia assembly of B.M.C.'s MG 1100 – a 3-piece moulding weighing 4½ lb. – is made from 'Propathene' ICI copolymer. Top (left to right): Caps, covers and gaiter dip moulded from 'Welvic' vinyl paste. Top side and under side of a Vauxhall accelerator pedal moulded in 'Propathene.' Shaped interior side trim panels and instrument cluster moulding, also in 'Propathene,' for the Vauxhall Viva

features under adverse conditions of temperature and humidity.

Plastic cars?

But the really big outlet for plastics will come when it can be proved that they are a satisfactory alternative to steel in body panels. Although reinforced plastics have been used for some years in specialist marques of car, steel is much more economic for mass produced models, although it is vulnerable to corrosion and considerably heavier than plastics. Motor manufacturers are well aware of the issues involved and the scales appear to be gradually tilting in favour of plastics such as glass-filled 'Maranyl'.

Polyurethane foams have been known for a long time but it is only in recent years that the complex problems involved in mixing urethane chemicals for their manufacture, both rigid and flexible, have been solved, with a process pioneered by Dyestuffs Division. These foams have three big advantages over materials used previously. These are low cost, ease of assembly and accuracy of shaping. This last advantage, arising out of the manner in which foam will expand to fill the mould shape, will make a valuable contribution to the construction of car seating, enabling complicated shapes to be made in a single operation, thereby reducing both labour and material costs.

Rigid foams, which have excellent properties for undersealing and for preventing the entry of dust and water inside the car, have not so far been widely used. But the usage of flexible foams has increased rapidly in recent years for seating, as padding for crash pads, arm rests, etc., and in some cars has already reached a rate of 14 lb. a vehicle. To promote the rapid development of these foams, the Division has strongly supported the foam equipment manufacturers and has also taken a leading part in setting quality standards.

So much in brief for what ICI has done in the motor car to date. The car of the future is likely to be shaped by two major forces that will exert considerable influence on design.

First, safety. Much greater use will be made of padding with flexible foams, since it is the rigidity of interior fittings, using traditional materials (despite the increasing use of 'Terylene' webbing in safety belts) which is mainly responsible for the high level of injuries and deaths caused to passengers by accidents. Secondly, wastage of materials. For every ton of motor car there is a ton of waste. Much of this is caused by the forging, processing and machining of metal parts, and much thought is therefore being directed towards the producing of the finished article with the minimum of wastage. It is here that plastics components, with their ease of forming and low requirement of additional processes, are likely to become important.

The appearance of new materials and new techniques of manufacture offer the motor manufacturer, the component supplier and the raw material producer an exciting but challenging future. More important, is the prospect of safer motoring which will result. Perhaps most important of all to us in ICI is the part yet to be played by our Company in realising this prospect.

New Universities and the needs of society

A. D. C. Peterson, OBE, MA

As Director of the Department of Education at the University of Oxford, Mr. Peterson is in a position to survey the whole field of education in Britain. His views, therefore, on the prospects for advanced technological and scientific training in the UK should not only command attention of themselves, but prove of special interest to all concerned with the future of British industry.

Sussex University

ALEX LOW

The Robbins Report deliberately rejects as impracticable any attempt to calculate the desirable level of University expansion from projections of the national need for skilled manpower. It would be absurd to attempt in a short article what that committee found beyond them and what the Advisory Committee on Scientific Manpower has on several occasions failed to achieve. I propose instead to make a few suggestions not about the numbers who should enter Universities but about what they are going to study there. This is, of course, just as important as numbers. Can we estimate the contribution which the new Universities are going to make over the next ten years in terms of graduates with a higher education in natural or social science, pure or applied?

The lamentable truth is that unless we are prepared to do something about the premature and excessive specialisation of our school system and the lack of counselling at the end of it, we cannot. University expansion is being planned on the basis of a significant increase in the proportion of students in faculties of pure and applied science. Yet Professor Moser, who was responsible for the statistical part of the Robbins Report, told the Home Universities Conference in December that competition for University places in arts subjects would probably intensify over the next few years while there might be vacancies in science and technology.

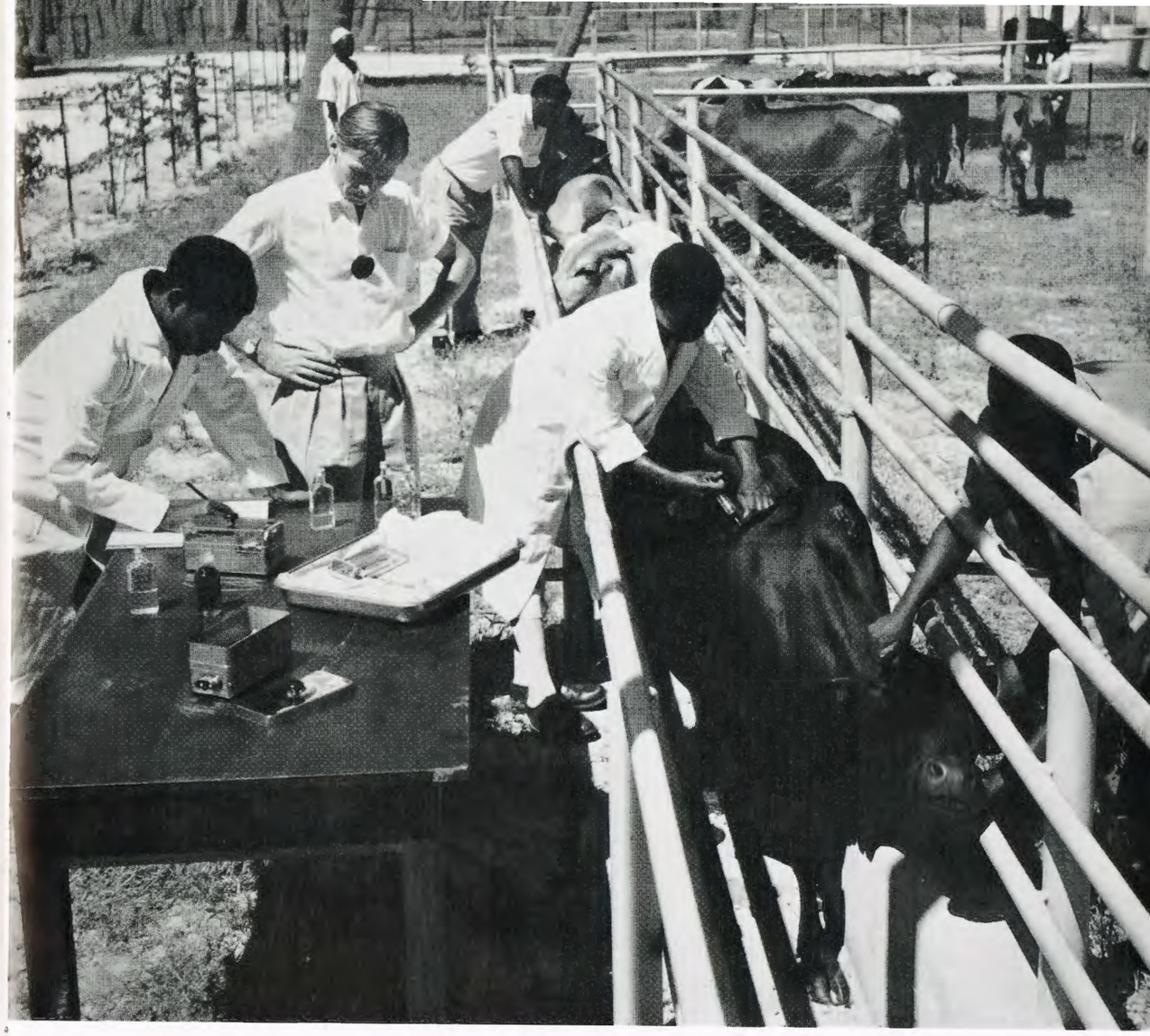
The reason for this extraordinary situation—the negation of all educational planning—is perfectly clear. It is that we in England and Wales, alone of all civilised nations, compel our ablest youth to choose whether to be a scientist or not at the age of fourteen or fifteen. If, as actually happened, a higher proportion of those of University age and quality today chose three or four years ago not to enter the science side of the sixth form, there is no point whatever in the Universities offering more places in science and technology. The potential entrants are not there and we could have told three or four years ago

that they would not be. If the trend towards arts and away from science at the point of entry to the sixth form continues, as it seems likely to do, there will be no point whatever in planning an expanded proportion of science places in the Universities. There will be nobody to fill them.

If then as a matter of Government policy we want to alter the balance of numbers in Higher Education in favour of more scientists and technologists it is useless planning Higher Education alone. We shall have also to do one or other of two things in the schools. Either we shall have to control the balance between the arts and science sides in sixth forms or we shall have to abandon our policy of premature and one-sided specialisation, so that the final choice between arts and science is still open on entry to the University. The first alternative is frankly pretty horrifying and would run counter to our whole educational tradition. It would mean directing schools, and compelling schools to direct pupils, in a way which would rightly raise an outcry from both. The second has long seemed to me to have very great educational advantages, quite apart from the silly position in which we find ourselves today as a result of planning one stage in education without any reference to the preceding one. The essential point, however, which needs to be made with all the force possible, is that if we are serious about this issue we must *do* something. It is not enough to talk. It has become customary of recent years to deplore the effects of premature specialisation as if it was some kind of act of God like a bad harvest or a hurricane. On the contrary it is something which we impose on our ablest boys and girls mostly against their will and which we could start changing tomorrow if we wished to. Since it is the Universities who, through their entrance requirements, control the curriculum of the sixth forms it is surely up to them either to tell the Ministry of Education to plan the balance in sixth forms to fit in with the balance in University places, or else to change their entry requirements in such a way that sixth formers are enabled and encouraged to keep open the choice between arts and science at the University until the end of their school careers.

But it is not merely that a proportion of our ablest boys, varying between a third and a half, cut themselves off from the possibility of a scientific education three years before they even enter the University. There are other factors which make it impossible to forecast the contribution of the new Universities to meeting social needs. Many of them, in line with the recommendations of the Robbins report, are proposing to develop new and interesting courses in the technologies and social sciences which might be expected to produce young men and women well fitted for a career in industry. But how can we be sure that students will opt to take these courses and that we shall not find vacancies in them just as we find vacancies in the faculties of applied science today? It has long been a feature of the English educational system, as compared with the American, Russian, Scandinavian, German, Swiss or French that the ablest section of those who *do* choose science opt almost unanimously for pure as opposed to applied science at the University. By and large engineering gets the rejects from physics. An enquiry recently carried out by the Oxford University Department of Education indicated that one of the main reasons for this is that the 'image' of pure science is very much more attractive to sixth formers, and even to sixth form masters, than that of applied science. From the replies given by sixth formers to a questionnaire, it is clear that this impression is largely based on sheer ignorance. Not only did we meet the prevalent and vague opinion that pure science was more 'interesting', but the much odder view that pure science was an altruistic activity carried on for the benefit of humanity while applied science was a mercenary activity attracting only those who wanted to get on in the affluent society. The old vision of the benefactor of mankind who makes two blades of grass grow where one grew before or who bridges a hitherto impassable river seems to have vanished before that of the nuclear physicist in a white coat. Here again it is useless for Government agencies, who recognise the desperate need of the developing countries for British technology, to provide at last the cheap British technological textbooks if there are going to be no teachers to teach from them. The answer to this problem of misconception seems clearly to be the development in this country of Counselling services at the point of transfer from school to higher education of the type that is now normal in the United States. The corollary of giving young people a real choice between different channels of higher education is to give them the information on which a rational choice can be made. At present the choice is made at an age when the boy or girl is far too immature to make it and has virtually no organised information on which to work. No one wishes to restrict their freedom in the interests of planned social needs, but at least they should be aware what the needs are and not expected to make the choice until they have the maturity and the information to make it with their eyes open. Unless we can ensure this the contribution of the new Universities to the educated and beneficent society may well be far less than the increase in numbers suggests.

The Birmingham College of Technology



Technical co-operation in East Africa. At the Central Veterinary Laboratory, Dar-es-Salaam, Tanganyika, the chief resident medical officer supervises inoculations

PEOPLE & EVENTS

New Year Honours

Three ICI names appeared in the New Year Honours List. **Mr. J. E. Davies,** former ICI taxation controller, receives the CBE, **Mr. H. J. Welbergen,** lately chief scientific glassblower of Alkali Division, the MBE, and **Mr. A. J. Arnold,** a miner in the anhydrite mine at Billingham, the BEM.

As taxation controller, Mr. Davies played a leading part for many years in seeing that the views of industry were not overlooked when proposals for changes in taxation were made, and it is for his services in connection with industrial taxation that he receives his award. Mr. Davies, who has the unusual distinction for a taxation expert of being a graduate in chemistry, joined ICI in 1929 from the Inland Revenue, becoming head of the Taxation and Rating Section in 1938 and ICI taxation controller in 1944. He retired last July after 34 years' service.

Mr. Welbergen, who retired from Alkali Division last October, came to Britain from Holland in 1922 and joined Brunner, Mond & Co. During his 42 years' service he played a large part in the advances made in techniques of fabricating new and complex laboratory apparatus. In particular he was responsible for the construction of observation windows for high-pressure vessels, and he devised a glass-insulated seal for conducting electrical current into autoclaves worked at pressures up to 3000 atmospheres. This latter device was an essential feature of the full-scale equipment for polythene manufacture by the ICI process.

Mr. Arnold has completed nearly 30 years' service with ICI at Billingham and is a former works councillor. He has been a member of Billingham Urban District Council since 1955 and was its chairman last year. A keen trade unionist, he was for some years chairman of the anhydrite mine branch of the TGWU. He has also been interested for many years in social welfare and is a former chairman of Billingham Youth Organisations Committee and a member of the Stockton Co-operative Society's Education Committee.

Mr. S. P. Chambers, *ICI Chairman, received the honorary degree of Doctor of Science at the University of Bristol on 6th December. Others honoured included Sir Wilfred Anson, chairman of Bristol University Council and a former deputy chairman of the Imperial Tobacco Co., Sir Arthur Bliss, Master of the Queen's Musick, Professor R. B. Braithwaite, Knightbridge Professor of Moral Philosophy at Cambridge, and the Rev. Frederic Greeves, president of the Methodist Conference last year. The ceremony marked the opening of the University's restored Great Hall.*

Mr. Davies

Mr. Welbergen

Mr. Arnold

Chemical plant for the USSR

At a meeting in London on 16th December between the USSR Mission led by Mr. V. S. Alkhimov and Mr. V. A. Klentsov, and **Mr. S. P. Chambers** together with a number of ICI directors and senior technical staff, the Russian representatives were informed that whereas in the past ICI had confined itself to supplying know-how, it would in future be prepared to act as a contractor, supplying both plant and know-how. Previously ICI had left it to Techmashimport, the Soviet State Buying Organisation for complete plant and equipment, to find suitable contractors. Mr. Klentsov, president of Techmashimport, made it clear that the new arrangement would be more convenient to the USSR and could lead to more extensive business with the UK.

The Company is already under contract to supply know-how and to train operatives for major polythene plants to be built in the USSR by Simon Carves Ltd., and is at the moment negotiating to do the same for a 'Terylene' plant, to be built by a consortium of British engineering firms.

Mr. Harold Smith is the ICI director responsible for setting up the organisation for carrying out negotiations and for constructing plants for which ICI secures orders. It is intended to employ the permanent staff of the European Council, and in particular the full-time services of **Dr. A. M. McKay,** under the general direction of **Mr. Douglas Bell,** chairman of the European Council, in supervising the negotiations and in executing contracts.

Polythene for Compac

Over 6000 tons of polythene were supplied by ICI and its Commonwealth subsidiaries for the insulation and sheathing of Compac, the new 8700-mile submarine telephone cable which links Canada and Australasia. The cable is of the lightweight unarmoured type designed by the GPO, and developed by Submarine Cables Ltd. in conjunction with the Post Office.

Special grades of 'Alkathene,' ICI's polythene, were developed for the project, and the manufacturing details were passed to Canadian Industries Ltd. and ICI of Australia and New Zealand, who were able to reproduce the special grades, since they use the same manufacturing techniques as those used by Plastics Division. The cable was made in England by Standard Telephones and Cables Ltd. and Submarine Cables Ltd.

Compac is the second major cable of the GPO lightweight unarmoured type to be installed as part of the projected Commonwealth telephone link. The first cable of this type was Cantat, between Britain and Canada, which went into service in 1961 and which was insulated and sheathed with polythene supplied jointly by ICI and CIL. Among other submarine cables insulated with 'Alkathene' is the recently installed TAT3, a lightweight cable of American design which runs between Britain and the USA and which came into service last October.

First call

Shortly after H.M. the Queen inaugurated Compac, **Mr. T. V. Spencer** of Plastics Division's Polyolefines Sales Department became the first member of the British public to use the service. Mr. Spencer's call came through at 1 a.m. GMT on 3rd December, and he held a conversation lasting about 15 minutes with **Mr. A. B. Denovan,** marketing manager of ICIANZ's Plastics Group. The call was made to discuss some details over the supply of polythene for the next phase of the cable (Seacom), which will link up Australia with Hong Kong and Singapore.

"It was rather faint, but perfectly clear—not quite as good for reception as the inaugural ceremony which I heard earlier on the radio," commented Mr. Spencer.

The scrip issue

Many readers will have received on 25th January stock certificates for the extra shares due to them under the ICI scrip issue. There are now well over half a million ICI stockholders—nearly three times as many as at the end of the war—and the recent scrip issue operation is not only the largest handled by the ICI Registrar's Department but also the largest share handout ever made in this country. It involved the preparation of some 424,000 stock certificates, which if laid out end to end would stretch from London to Birmingham.

The recent scrip issue also has another claim to fame. It is the first time that such an operation has been handled within ICI by computer. The decision to transfer the work of the Registrar's Department to computer operation, using spare capacity on Paints Division's IBM computer at Slough, was taken nearly two years ago, and the target date set for the changeover was 10th October 1963. During this time something like 3½ million punched cards were prepared. Preparations were completed on 17th October—just a week late—but what no one had foreseen was that the proving run for the new system would be a scrip issue, the biggest single operation ever tackled by the department.

Arrangements were made to use spare time on the Mond Division's computer at Northwich in the event of any major breakdown on the computer at Slough, for the time schedule was so tight that for many staff weekend, night shift and Christmas holiday duty was required even with a trouble-free run. In the event all went far more smoothly than anyone had dared hope, and to the great credit of all the staff involved, both at Millbank and at Slough, the first batch of certificates was ready to be sent off to the GPO for sorting on 16th January to await mailing on the 24th January.

The whole operation of printing the allotment return, the stock certificates and the cheques took 145 hours on the computer. This compares with about 20,000 man-hours by the old manual methods.

The m.v. Lind *takes on the first bulk shipment of trichlorethylene and perchlorethylene to be loaded at Runcorn from a new "tank farm" which occupies a site last used by shippers of china clay more than 25 years ago. Bulk shipment of trichlorethylene to the USA (from Liverpool) started just over five years ago. Combined shipments of trichlorethylene and perchlorethylene, used for metal degreasing and dry cleaning respectively, now exceed 15,000 tons a year*

Some of the 424,000 *stock certificates arriving at Millbank from Slough by armoured van*

Agricultural Division

Two new ICI Divisions came into being on 1st January. The merger of the Alkali and General Chemicals Divisions to form the Mond Division has previously been reported. The second new Division, announced after we last went to press, is the Agricultural Division. This Division is responsible for the Company's interests in agricultural chemicals, except veterinary products, and has taken over the business and assets of Billingham Division (including its interests in industrial chemicals and building products). It is also responsible for the Company's interests in Scottish Agricultural Industries Ltd., Richardson's Fertilisers Ltd. and Ulster Fertilisers Ltd., and from May 1964 is to assume responsibility for Plant Protection Ltd.

The chairman of the new Division is **Mr. W. d'Leny,** formerly chairman of Billingham Division, and on his retirement on 31st March he will be succeeded by **Mr. R. S. Wright,** formerly one of the managing directors of Billingham Division. There are four deputy chairmen, all previously on the Billingham Division Board, **Mr. K. H. L. Cooper** (formerly a managing director), **Mr. R. A. Hamilton** (formerly development director), **Mr. S. D. Lyon** (formerly production director) and **Mr. R. W. Pennock** (formerly a commercial director).

Mr. John A. MacAulay, *a director of Canadian Industries Ltd. since 1959, visited Oslo in December to receive the Nobel Peace Prize on behalf of the League of Red Cross Societies. Our photograph, taken at a meeting of the CIL Board in Montreal, shows him with (left) Mr. Peter Allen, a Deputy Chairman of ICI and chairman of CIL, and (right) Mr. Leonard Hynes, president of CIL. Mr. MacAulay was elected chairman of the International Red Cross in 1959 in succession to Judge Emil Sandstrom of Sweden.*

A farewell staff dinner *for Mr. James Hackney, retiring chairman of ICI(China), was held in Hong Kong on 27th November. Mr. Hackney (right) is seen receiving a golf trophy from his successor, Mr. I. H. Kendall. Mr. Hackney also received a portable typewriter as a retirement gift and Mrs. Hackney received an electric food mixer.*

New Division Chairman

Mr. R. S. Wright, who is to succeed **Mr. W. d'Leny** as chairman of the new Agricultural Division in April, had spent most of his Company career with Dyestuffs Division, before going to Billingham. He started in 1937 at Grangemouth as a works chemist, became assistant works manager at Blackley in 1949, transferred briefly to Grangemouth Works in 1952, and then in 1953 was made works manager of Huddersfield Works.

In 1955 Mr. Wright joined the Board of Pharmaceuticals Division as production director and at the same time was Production Department manager in the Dyestuffs Division. He became production director of Dyestuffs Division in 1957 and in 1958 research director.

Mr Wright

Mr. Wright is a Nottingham man and was educated at the then University College, Nottingham, where he gained a London University B.Sc. with first-class honours in chemistry. He is an Associate of the Royal College of Chemistry.

Mr. and Mrs. Wright have two sons and a daughter. Mr. Wright's interests include music, photography and gardening, with rugby and rowing in the way of sport.

In "Britannia"

The Agricultural Division's education officer, **Mr. J. N. Patterson,** recently received from Buckingham Palace a letter expressing the Queen's thanks for the silver-plated desk calendar made for her by apprentices at Billingham and accepted on her behalf by the Duke of Edinburgh when he visited the Billingham Site last October. The Palace letter states that Her Majesty has graciously given orders that the calendar be placed in her cabin in the Royal Yacht *Britannia.*

New man in India

Mr. Cyril Pitts, who succeeds **Mr. A. R. Foster** as chairman of ICI (India) in April, has been a member of the ICI (India) Board since 1956 and a joint managing director since April 1961.

Mr. Pitts

Mr. Pitts joined ICI as a trainee at Billingham in 1938 and was posted to Dyestuffs Division in 1939. In 1940 he was transferred to ICI (India) and after serving with the Forces from 1942 to 1945 was appointed manager of Bombay Regional Sales Office in 1953. In April 1956 he was appointed to the Board of ICI (India) as commercial director and was made a joint managing director in April 1961. He is also a director of the Alkali and Chemical Corporation of India, of which he was managing director from 1960 to 1962.

New dyes for wool

The first three of an entirely new range of dyes—the 'Procilan' dyes, designed specifically for use in wool dyeing—were announced by Dyestuffs Division in December. Like ICI's now world-famous 'Procion' dyes, they are reactive dyes. This means that they react chemically with the fibre and so become an integral part of the fabric. 'Procilan' dyes should enable the textile industry to produce dyed goods with better than ever wet-fastness and of very high light-fastness.

Since the discovery of the first reactive dyes by ICI chemists was announced in 1956, the 'Procion' range has been expanded from one colour to more than 50.

Remploy post

Mr. E. A. Bingen, a former ICI deputy chairman, has succeeded **Sir Alec Zealley,** also a former director of ICI, as chairman of Remploy Ltd., the Government-sponsored organisation set up in 1945 to provide employment for people too severely disabled to be employed under normal industrial conditions.

Since Remploy's first factory was opened in 1946, 90 factories have been established throughout Britain, and these now provide employment for almost 6500 handicapped men and women. About 40% of the employees are ex-service. Including fit staff and labour the company's total strength is well over 8500.

All kinds of disabilities are represented among Remploy's employees, from amputations and paralysis to less visually obvious disabilities such as heart and chest complaints and epilepsy.

The organisation is divided into a number of trade groups manufacturing furniture of all kinds, engineering products, cardboard boxes, knitwear, and leather and textile goods. It also has factories which provide services in specialised packaging and bookbinding.

The factories are operated as far as possible on normal industrial lines and the company's products are sold on an ordinary commercial basis, annual turnover being in excess of £6 million. Inevitably the operations of Remploy involve a substantial Government subvention. The factories are not rehabilitation centres, although in fact about 200 employees leave every year to return to ordinary industry.

RETIREMENTS

Some recent announcements of retirements include:

European Council: Mr. B. R. Goodfellow, techno-commercial director (retired 31st December). **Head Office:** Mr. L. A. Inglis, assistant personnel manager (retiring 29th February). **Heavy Organic Chemicals Division:** Mr. F. Potter, administration manager (retiring 29th February). **ICI (Hyde) Ltd.:** Dr. W. W. Webb, director responsible for research (retired 31st December). **Mond Division:** Mr. E. S. Hyde, former secretary of General Chemicals Division (retired 31st January). **Paints Division:** Mr. L. D. Stewart, a joint managing director (retiring 30th June). **The Regions:** Mr. J. Ferguson-Davie, Southern Region sales manager of IMI (Kynoch) Ltd. (retiring 31st March); Mr. E. J. C. Parker, regional manager of the Southern Region (retiring 31st March). **ICI (India) Private Ltd.:** Mr. A. R. Foster, chairman (retiring 31st March).

Mr. Farquharson

Mr. R. Farquharson

Mr. Ronald Farquharson, ICI shipping manager since 1944, retired on 31st December. Mr. W. D. Scott, ICI commercial director, writes:

Ronnie Farquharson has very nearly 44 years' service to his credit since he joined Brunner, Mond & Co. at Northwich in January 1920. After serving there for five years, he went out to China and worked for Brunner, Mond & Co. (China) and later ICI (China) in their various offices for ten years—a period of his life which gave him a keen interest in and affection for China and its people. One of his sons carries on this tradition and is today with ICI (China) Ltd. in Hong Kong. In 1935 Ronnie returned to England, and after a couple of years in the Purchasing Department joined the ICI Shipping Department in 1937, becoming assistant manager in 1939 and manager in 1944.

Ronnie's main work has probably been the excellent relations he built up with all the leading shipping lines after a period of considerable strain in the mid-thirties, a relationship which stood ICI in good stead in the difficult years after the war, when shipping facilities were limited and shipping space was hard to get. ICI's exports, rising from £38 million f.o.b. in 1949 to over £100 million in 1962, make the Company one of the biggest exporters in the UK, and the responsibility of the Shipping Department in this vital business has been a heavy one.

He has also served on a number of bodies connected with shipping, including various commissions of the International Chamber of Commerce—he was, for example, chairman of the Working Party of Sea Transport Users—and he played a prominent part in the creation of the British Shippers' Council.

As a man, Ronnie's main traits are his genial and unfailing kindliness and his good-fellowship, and there are probably very few people in the Company with a wider circle of friends in all walks of life—for it is almost impossible to know him without counting him a friend. He is a magnificent teller of a good story, whether by word of mouth or on paper, and has to his credit some well-known books, notably *Confessions of a China Hand.* He was for years a contributor to *Blackwood's Magazine* and to the *ICI Magazine.* Of his many outside activities we have no complete list, but we do know that one work very dear to his heart is his old school, St. Bees, for which he has done so much.

In recent years Ronnie has been stricken by illness, severe but lightly borne. Our best wishes go to him and his wife for a long and happy retirement in his native Cumberland. Many will miss him inside and outside this Company.

Mr. B. R. Goodfellow

Mr. B. R. Goodfellow, techno-commercial director of the European Council, retired on 31st December after 38 years' service. Mr. E. J. Langford, ICI overseas controller, writes:

Basil Goodfellow, who joined Synthetic Ammonia and Nitrates Ltd. in 1925 after acquiring a first-class honours degree in natural science at Cambridge, has had a very wide experience during his 38 years' service. After seven years at Billingham and three in Head Office, during which time he went round the world accompanying Col. Pollitt, then technical director of ICI, he went out to China in 1935 and served as technical director of ICI (China) Ltd. until early 1939. During the war years, after a brief spell in the Alkali and General Chemicals Groups, he went to the Ministry of Economic Warfare and served in Singapore and India. After the war he returned to Millbank, first as head of the India Department, playing a full part in the development of ICI's early manufacturing interests in India, and latterly as techno-commercial director of the European Council.

The width of Basil's activities in ICI is more than matched by the variety of his other interests, and I think the main impression he made on most of his many friends was of a man who followed his hobbies with an engaging enthusiasm combined with very marked skill.

Mr. Goodfellow

Whether as a mountaineer, photographer, driver of fast cars, or traveller, Basil enjoys what he does and does it with distinction. His interest in mountaineering has been marked both by his appointment as president of the British Mountaineering Council and as honorary secretary of the Himalayan Committee which organised the successful assault on Everest in 1952. He has taken a keen interest in the work of the India, Pakistan and Burma Association and also the Oxford Summer Business School. He was awarded the OBE in June 1962.

Basil has now joined the United Nations, and will lead an industrial survey mission to Iran. He will take with him the good wishes of his many friends in ICI.

50 Years' Service

Mr. G. Appleton (Alkali) 19th December 1963

Mr. J. Dutton (Alkali) 8th November 1963

Mr. F. Walker (General Chemicals) 21st November 1963

PHOTOGRAPH BY PATRICK WARD

Our man in LISBON

TWELVE years ago in Lisbon a young manufacturers' agent named Pracana was interested in adding ICI nylon moulding powders to his list of selling lines and called to discuss the idea with Peter Beazley, who was then with the Portuguese branch of ICI (Export) Ltd. and is now marketing manager of Fibres Division. It was a meeting which was to alter the caller's whole career, for after an hour or so of conversation he was offered not the agency he was seeking but a job as an ICI salesman! He accepted—and today Eduardo Pracana, at 40, is local director and manager of the Portuguese branch, controlling a staff of 74 and running a business with a £3 million annual turnover in products which range from Dyestuffs Division 'Procion' dyes to catalysts from Billingham.

It was explained to him, that day in 1951, that the Portuguese branch, which had been founded only three years earlier, was planning to change from selling through local agents to direct selling by its own salesmen. In plastics, which would be his own responsibility in the southern half of the country, the changeover date was to be 1st January 1952. Not much time was left, and so he was asked if he could travel to England fairly soon, to visit Plastics Division and learn something about the products he was to sell.

Only one answer was possible, particularly from someone who since his childhood days in the Azores had been intensely interested in Britain and the British, and seven days later Pracana was at Welwyn. There he found himself not only immersed in an intensive study of the Division's products, but helping also to plan the sort of campaign which would be required to sell them.

Back in Portugal, he set about looking for plastics business wherever it could be found, especially among the new manufacturing industries which were being started as part of a Government-sponsored drive to make Portugal's mainly agricultural economy much more widely based. Two years later Mr. Pracana took charge of the plastics section of ICI (Export) Portugal, and for the next six years he and his colleagues worked to sell products such as 'Perspex,' PVC and 'Alkathene' in increasing amounts and from a steadily expanding range. One measure of their success is that almost all the illuminated advertising signs in Portugal today are of 'Perspex.'

In 1960 Eduardo Pracana was appointed fibres sales manager, taking over from Roy Chrystie, who had been the first manager of the section and was now being transferred to Barcelona, and he found wry amusement in recalling that at 18 he had decided against joining his father's textile business. Now here he was deeply involved in textiles. But he enjoyed it also, for the industry is a growing and important one for Portugal. The woollen side, centred on the mountain town of Covilha, and the cotton and synthetics sections in the north, all manufacture for both the home market and for export, thereby helping to maintain the country's favourable balance of payments. The most successful exports include 'Terylene' fabrics, which Portuguese firms make from staple and yarns supplied through ICI (Export) Portugal by Fibres Division. These sell well in a number of overseas markets, particularly in the Scandinavian countries, which are fellow members with Portugal of the European Free Trade Area, and the fibres section sees to it that the manufacturers are given all they require in the way of after-sales and technical service.

At the time of his appointment to the Fibres Section Eduardo Pracana was also made deputy to "Bill" Collett, manager of the Portuguese branch since its formation and ICI's representative in Portugal since the early 1930s, and he took over as manager when Mr. Collett retired last June. From small beginnings, the branch had by then expanded so much that there was a staff of over 70, including a sales force of 28, while to the main Lisbon office, which occupies three converted apartments in a block on the Rua D. João V, had been added other offices at Oporto and Covilha. The branch had become a busy forward-looking organisation, which not only represented ICI but also acted as agent for a number of other British companies, and Mr. Pracana thinks himself lucky to have taken over when he did, and from someone such as Collett.

A slim, youthful-looking man of medium height, an easy conversationalist, with a ready smile and an impressive command of English, he will be quick to tell you that it was due to the work of Bill Collett that the branch had become such an efficient, well-run organisation.

As the new man in charge, Pracana is naturally looking very much to the future, and he does so with a cautious optimism. He foresees no slackening in the intensely keen competition already faced by ICI products and in fact expects the attractions of Portugal as a growing, hard-currency market to bring in even more competitors from Europe—especially the six members of the Common Market—from the US and even from Japan. He believes, however, that the total market will grow as rising living standards lead the Portuguese to expect more and increasingly sophisticated goods in the shops, and that ICI can win its share of the new business, whatever the competition.

Trading patterns may change, as new secondary industries are set up and the economy is broadened; the Lisbon office can expect to sell less in the way of finished products and more of raw materials or intermediates for use by Portuguese manufacturers. These products may come from Divisions which are already well established in the Portuguese market or from others which have so far sold little there, and it was to prepare for either possibility that a few months ago Pracana visited all the ICI Divisions in turn. He wanted to see what they had to offer, not only in products but also in technical and after-sales service, for it is often service of this sort which makes the difference between a fat order book and a thin one in a tough, competitive market.

Mr. Pracana expects that the future of ICI in Portugal will be at least as eventful as its past. He anticipates plenty of hard work for himself and his staff, who are all Portuguese with the exception of Nigel Cowling, the deputy branch manager and manager of the dyestuffs sales section, but not so much that he will not have time for some family life (he and his wife, Gina, live in Lisbon with their four children) or for his other interests. These range from medieval architecture to music and the collection of first editions of books by Portuguese authors. **P.R.**

Faster than thought - the horizons of the electronic computer

by Geoffrey Campey

Technical problems arising in research, design and production are a commonplace feature of life within ICI. Often these problems can be solved empirically by the experience and knowledge of the people concerned. Another approach is to express the problem in a mathematical form and to find the solution mathematically. In the past this approach has often been discarded because the large amount of calculation involved has made the task impracticable, or has meant that the results would be obtained too late to be effective. But the need to increase efficiency and achieve higher productivity, together with the greater complexity of modern industrial processes, has required an accurate solution to such technical problems. The advent of electronic computers has enabled the solution to intricate problems to be reached within a reasonable time.

Machines to help man to do arithmetic are almost as old as civilisation. Probably the oldest of all the devices is the abacus, or bead frame. In the nineteenth century an Englishman, Charles Babbage, invented a machine to perform the complicated calculations involved in the construction of mathematical tables. His machine worked by mechanical means, but its operation took time. With the invention of electronic devices it has become possible to perform simple arithmetical operations at great speed, and the fastest machines at present available can add two numbers together in about one-millionth of a second.

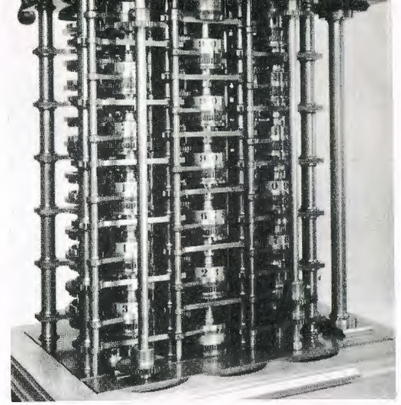
Besides its ability to perform arithmetical operations at great speed a computer has two other properties. First, it can store numbers within itself. This is clearly necessary if the computer is to use its great speed properly. Secondly, it can store within itself the instructions which define the task that it is to perform, which means that once it has been given the instructions the machine can carry out the calculation at great speed and without any intervention from human beings.

In order to use a computer to perform a particular task it is necessary to break down the task into its logical parts and then to write down a set of instructions which will cause the computer to carry out the required operations. This set of instructions is known as a Programme, and it has to be written in a language which can be interpreted by the computer. These programming languages are easy to learn and use, and a complete novice can often write a useful programme after only three or four days of tuition. When a programme has been written it is transferred to punched paper tape and fed into the computer, which then starts to obey the instructions. It is normal practice to write a programme to be as comprehensive as possible, in the sense that it solves a family of very similar problems rather than just one single problem. The individual problem to be solved at a particular moment is specified by providing data which the programme will require. This means that the same programme can be used many times by many different people, each submitting the data that define their own particular variant of the problem which the programme tackles.

In this way it is possible to construct a library of programmes which can be called upon when required. It is also possible to construct a library of a rather different sort. Often when a person is writing a programme he wishes to perform some standard mathematical process, such as the solution of a set of linear equations, and this is required so often by many people that a special piece of programme has been written to perform this task. Instead of each person having his own programme to perform this task, he merely asks for this special piece of programme to be inserted into his own programme. In this way problems which involve the solution of the more frequently occurring mathematical problems can be readily tackled.

In ICI the main centre for carrying out computing to aid in the solution of technical problems is the Computer Laboratory at Wilton Works. Since 1959 a Ferranti Mercury computer has been operated there by a section of the Central Instrument Laboratory, which is a Head Office department with headquarters at Bozedown House, near Reading. The present computer at Wilton is available to perform calculations for all Divisions of the Company. Programmes and data tapes originate in Divisions, most of whom possess their own facilities for producing the paper tape required by the computer. This is transmitted to Wilton over teleprinter or telephone links; the programmes and data are fed into the computer, which performs the required calculations and furnishes the results, again in the form of paper tape, which is transmitted back to the originator of the problem, again over the wire. This system ensures that results are received back from the computer as quickly as possible, often within a few hours of transmitting the programmes, and usually within 24 hours. About 1,000,000 tape characters are received or transmitted by the Computer Section every working day.

The Mercury computer was installed at Wilton in September 1959, and over four years the demand from the Divisions has approximately doubled each year, so that the computer has had to be operated on a shift basis for 24 hours a day. Every



Part of the difference engine, forerunner of a modern computer, invented by the English mathematician Charles Babbage in the nineteenth century. (Crown Copyright. Science Museum, London)

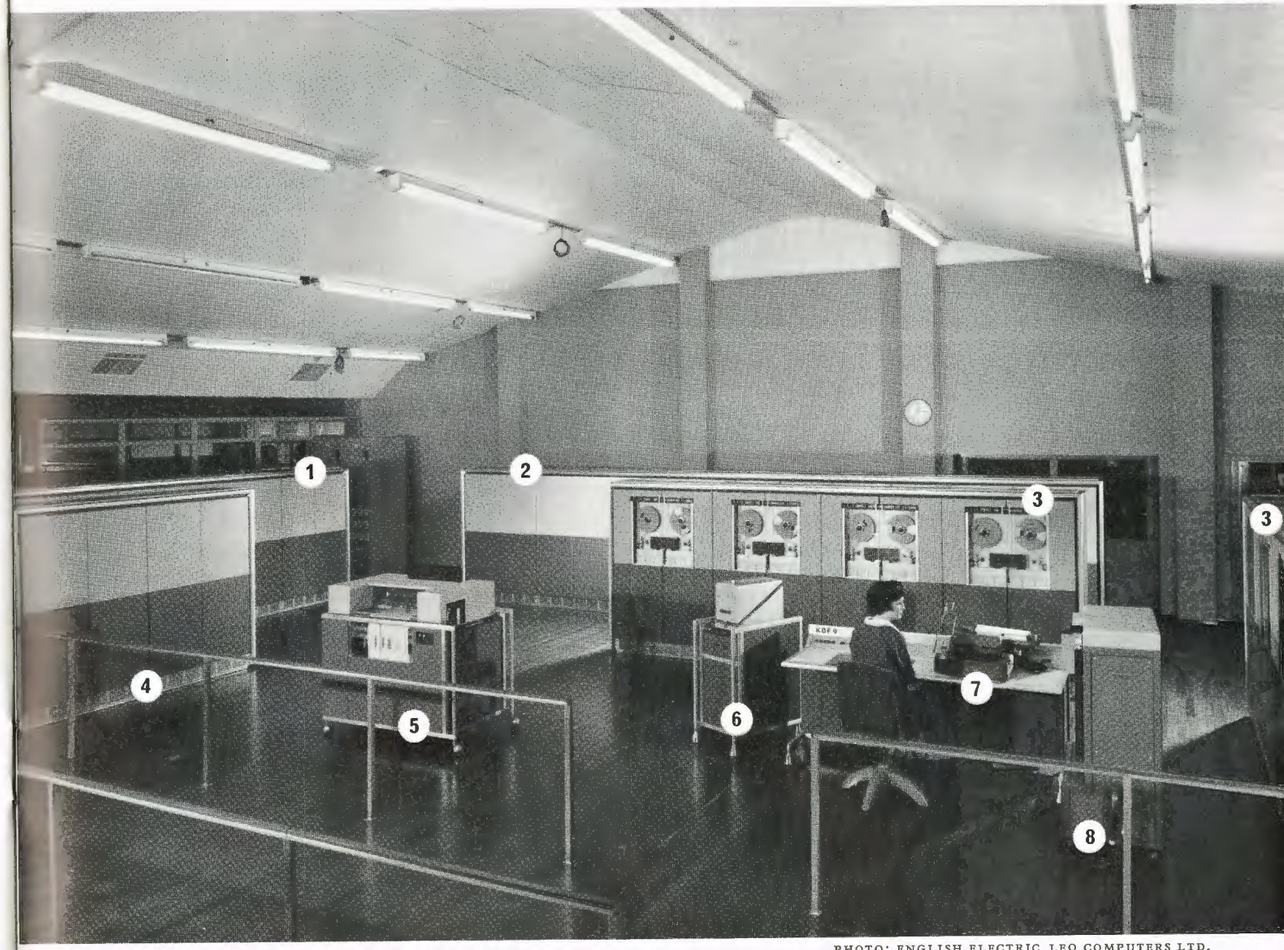


PHOTO: ENGLISH ELECTRIC LEO COMPUTERS LTD.

A TYPICAL ENGLISH ELECTRIC LEO KDF9 DATA PROCESSING SYSTEM

Key
1 Main Control and arithmetic units
2 Input/output and main store units
3 Magnetic tape units
4 Power supply units
5 Line printer
6 Paper tape punch
7 Control deck and monitor printer
8 Paper tape reader

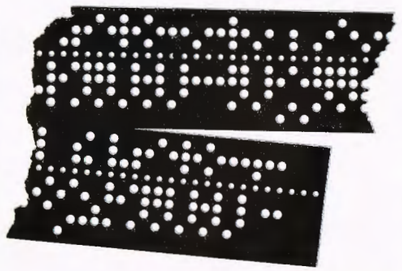
```
begin     open (20);
      for i:= 1 step 1 until n do
      begin     x[i]:= read (20);
            SUM:= SUM + x[i];
            R:= SUM + T↑2;
      LOOP:     if abs (R)≥10-3 then goto PASS;
            P:= P+erfc (y[i]);
      PASS:     T:= R/P;
            R:= T;
            if T > P then goto LOOP else
            if T > P×2 then goto PASS;
            SUM:= SUM+y[i]×3
      end  ;
      RESULT:= SUM/P/(T+R↑4)
end;
```

day about 150 separate problems are run on the machine, and every month about 50 new projects are started. Well over 1700 programmes in all have been written.

Of the 1700 programmes, 150 are general-purpose programmes which are used by many people. An index of these programmes has been drawn up, and a copy of this index is kept in all Divisional libraries. In addition to this library of complete programmes, there is a library of 45 sub-programmes which can be incorporated into other peoples' programmes to perform special (usually mathematical) tasks.

The enormous growth in the demand for technical computing within ICI has meant that the Mercury computer is now proving inadequate, both because of the amount of work which is being submitted to it, and also because the size of the problems being tackled is such as to exceed the capability of the machine. The Company has therefore purchased an English Electric Leo KDF9 computer, which is now being commissioned at Wilton. The total installation, with accommodation, at Wilton is costing in the region of £400,000. This machine will be able to perform about twenty times as much work as the Mercury computer can and will be able to deal with up to four programmes simultaneously. In addition to installing a new computer, facilities for transmitting programmes, data and results, at speeds of up to ten times the normal present rates, are being installed in some Divisions. This means that a better, speedier service will be offered to users of the central machine. At the same time it is hoped that a considerable reduction in cost of computation will be possible.

A piece of a computer programme in ALGOL, one of the programming languages which can be used for the English Electric Leo KDF9 computer. Below: punched paper tape corresponding to the above ALGOL text



One of the advantages of the new computer is that one of its programming languages—ALGOL—is an internationally accepted language, and many programmes which have been written and published in scientific journals will be available for use by anyone employing the computer.

Programmes are written by people in all parts of ICI. There are some people whose work consists solely of writing programmes for the computer, but many people only write a programme once or twice a year to help them solve a particular problem which has cropped up.

The problems which are now being tackled cover an enormous range, indeed one of the most remarkable aspects of a computer is its extreme flexibility: there seems to be no end to the possible application of such machines. Research problems which have been tackled have varied from simulating the way in which chains of molecules link together to form a polymer, to estimating the rate constants which satisfy the experimentally observed behaviour of a chemical reaction. On the design side, the stresses and strains undergone by complex piping networks, caused by temperature changes, are now calculated on the computer as a matter of simple routine, and many other design calculations are being mechanised in this way. Production planning by computer is now, for some Divisions, a matter of weekly or daily routine.

In the Company, computers are no longer a novelty restricted to a few special applications. They have been used to solve a wide range of problems by staff in many different jobs. Many of the problems now solved on the computer have a direct effect on the economy of our production units, the accuracy of our new designs and the speed at which we respond to changes in our basic data. The new KDF9 computer will be the basis of a computing facility as good as those serving the German and American chemical industries: it will indeed possess certain features in advance of those of our competitors. The advent of this new computer should therefore make further improvements possible at an even faster rate.

GARDENERS' GUIDE

by Percy Thrower

Early last month I noticed the first few snowdrops coming into bloom in my garden, and these from bulbs planted in October. The green leaves of the crocus are showing above the soil and here and there a flower on the purple *primula Wanda*. What a contrast to last year, when everything was under a deep carpet of snow for weeks on end and the thermometer was dropping as low as two degrees below zero.

The welcome sight of the first snowdrops urged me to push ahead with planting, and I found the soil in fit condition to plant more trees, shrubs and roses. At this time of year most of us only have the weekends for work in our own gardens, and it is up to us to make the best of every opportunity to get the outstanding planting finished. The end of March is about the latest time for the planting of all kinds of deciduous trees, shrubs and roses, but evergreen subjects can be planted well into May.

The seeds I ordered early in January were not long in coming through the post. To be sure that they would not be damaged by dampness or mice I have put the packets in a biscuit tin and stored it in the cool of the garage. The potato sets have been set up in shallow trays, "rose" end upwards, and placed under the greenhouse staging of the cool greenhouse to encourage sturdy "chits."

I always aim at having a few new potatoes for Easter and have planted three sets of Sharpes Express in each section of two orange boxes, making eighteen sets in all. I used a mixture of equal parts of soil and peat and added a small handful of 'Plus' fertilizer for each two sections. At the time of writing these are under the greenhouse staging, but as soon as the tops begin to show above the soil they will be brought up to the light. I have allowed room for about two inches of top dressing with more soil, which will be in a way similar to earthing up the potatoes in the garden. Easter this year falls at the end of March, so they will have to make rapid headway to produce new potatoes by then, but even if they are very small the first new potatoes, flavoured with a few sprigs of mint, are always welcome.

To have early mint I have lifted some roots. These are now planted in a box and are under the greenhouse staging. Good use can be made of the space under the staging if one plans carefully. I have, in particular, one section blacked out with sacking hanging all round, and from here I am able to pull some delicate pink sticks of forced rhubarb. From the seakale lifted in the autumn the thick roots have now been made into root cuttings four to five inches long with a slanting cut at the thinner end and a straight cut across the top. These root thongs or cuttings are now standing upright, almost completely covered, in a box of sand. Very soon purplish-green shoots will begin to grow from the top and new roots will form lower down.

In April these will be planted out on a part of the vegetable garden which has been dug and manured and dressed with 'Plus' fertilizer at a handful to each square yard. The young plants will be planted at two foot intervals in rows 2½ feet apart. The shoots at the top of each root cutting will be thinned down to one, and as this grows it will form the large crown for forcing next winter. Seakale is a comparatively easy crop to grow, and the large leaves spreading out over the soil keep down the weeds.

The earliest peas and broad beans, like the early potatoes, are the most delicious of all, and in February I shall be sowing early Laxton peas, five in each 3½ inch peat pot. I shall also sow broad beans, and I shall manage to find room for both peas and beans under the greenhouse staging until they begin to come up, which usually takes about ten days. These, planted out in April and protected from cold winds with twiggy sticks, provide the first picking of peas and broad beans.

In March sowing out of doors should be possible in most parts of the country. Soil dug over in the autumn or early winter should work down well and make a good seed-bed. The making of such a seed-bed is the necessary prelude to a successful season. A seed-bed should be well enriched with the essential plant foods, and the soil must be firm and have a fine even tilth over the surface. This is achieved by firstly sprinkling 'Plus' fertilizer at the rate of a handful per square yard over the surface, and this will mix in as raking and firming are done. To be sure the soil is firm it will require treading twice in different directions. For this the surface of the soil should be dry so that it does not stick to the boots. The final preparation for sowing is fine and even raking. One of the biggest mistakes one can make is to sow seed too early and too thickly.

Another important task for February or early March is to divide and transplant hardy border plants. Those most in need of lifting and dividing will be michaelmas daisies, *heleniums*, *monarda*, *rudbeckia*, *sedum spectabile* and *artemisia lactiflora*. Before replanting the small outside portions of the clumps be sure to enrich the soil with 'Plus' and sprinkle some also round those not being lifted and replanted. The lawn, too, will benefit from raking or sweeping and some 'Plus.'

Finally, in late March we must prune the roses, and to be sure of a good clean beginning one should spray each bush with 'Tulisan' to prevent the spores of black spot fungus and mildew beginning their destructive work. After spraying, sprinkle 'Plus' and a little Epsom salts round each bush. By using a good organic-based fertilizer in the spring as the new growth begins, we shall reap the benefit in crops and flowers throughout the whole year.

"Dash of Dulux" profile of a famous canine personality

Dash the 'Dulux' dog—otherwise Shepton Daphnis Horsa—is already something of a national figure. He was born in Stafford 3½ years ago and now lives in Enfield. Like all public figures, Dash has a private life as well. Any delving into this sort of area is risky, of course, because all too often the private lives of one's best-loved personalities turn out to be full of disenchanting revelations. Not so with Dash.

Success certainly hasn't gone to his lovable woolly head. Once out of the studio, Dash is again the essential home-lover, the family dog, whose greatest pleasure is to lie in front of a blazing fire surrounded by his family. His tastes are modest, his pleasures of the simplest kind. His favourite toy—an empty washing-up liquid canister!

Dash is very even tempered. Few things ruffle him, but he has a very strong will. If he decides he doesn't want to move in any instructed direction, nothing will move that 90 lb. of his. Above all he likes company. He rarely goes out—even into the garden—unless accompanied. And when the weekly ironing is being done, Dash is not happy until he has a plate of biscuits to eat right under the ironing board. He's full of fun and a born extrovert. He loves dressing up, showing off and bouncing around—and if his performance for any reason goes unnoticed he will not let this last for long.

Like most dogs, Dash doesn't really appreciate a bath. Any attempt starts off fairly sedately but ends up in the usual free-for-all. And with Dash this is something of a battle royal. Although he is not particularly vain, the thickness of his coat means he must have very careful and regular grooming to keep him in tip-top shape. This he enjoys. But try to comb the hair away from his eyes and he simply shakes it back again. Dash likes it better that way—and so he should. It's part of his shaggy charm.

In the end all this attention pays off, for Dash has already won two important honours—Cup for Best Dog at the Alexandra Palace and a reserve card at Cruft's last year. This means that if any of the first three dogs had been disqualified, Dash would have moved up one place.

Any unsuspecting newcomer to the Dash household who offers helpfully to take him for a walk, is in for a very big surprise—instead of taking, he will very forcibly be taken. Not that Dash intends any harm. He just doesn't know his own strength.

Dash is fastidious about what he eats. He is also a strict teetotaller. He likes being hand fed, and even if he refuses his food when it's first put down, by the end of the day he will have got through 1–1½ lb. of meat, usually raw, plus meal. He likes fish, and usually gets it once a week. Otherwise it's ox heart or cheek: food in fact for a man-size dog.

On the whole, life has been good to Dash. But of course a model's work isn't all roses. Ask Dash, for instance, about the day they shot the Jelly Gloss commercial. He was playing his part (and really in it), looking up at the paint that wouldn't drip, *couldn't* drip. And what happened? It dripped. Quite lavishly—on top of his head. Did he see red! Or was it brilliant white? Dash can't remember. Nobody's fault, of course. The paint doesn't drip under normal conditions, but the heat of the TV studio lights caused it to lose its thixotropic qualities. There was the other time too when Dash unwittingly nearly committed suicide. It wasn't a question of a fit of temperament or things getting too much for him. He was merely overtaken by a bounding joy while posing on top of Vogue House. He jumped up on to a parapet and was just going to jump off when something told him he would go too far and be sorry, and he stopped just in time. An anxious moment for onlookers, though. Fortunately the wall was wide.

Dash has quite a fan mail. Almost every day letters come from all over the country—and abroad—asking about Dash and for photographs. One reader enquired how much paint she would have to buy before she got Dash as well. His impact as far as 'Dulux' is concerned has certainly had a marked effect on one little boy. Out walking with his mother he was heard to remark, when she pointed out to him an Old English Sheepdog, "That's not a sheepdog, that's Dash the 'Dulux' dog!"

Besides his work for ICI, Dash has appeared in promotions for Hardy Amies clothes, Basildon Bond notepaper, and on the Dick Emery Show. Most recent of all, he was featured in the December edition of *Queen*.

What are his plans for the future? Who knows! Perhaps a film, maybe a pantomime. But almost certainly some charity work in the New Year. By the way, if anybody feels like writing a play around a lovable playful all-English Old English Sheepdog, Dash could no doubt be persuaded. And if there's a point in the play where he has to sit on a chair much too small for him, Dash would be more than happy. He's just a contortionist at heart.

PHILIP JONES-GRIFFITHS

Lewis Inglis says goodbye

Dear Editor,

You politely expressed surprise when I told you that I reach the retiring age in February 1964. *You are not so surprised as I am. You asked me to write something for the Magazine and this is it and you can, of course, publish it if you want to. I may say I am unable, as yet, to appreciate that it is I who am to retire at age* 62, *and not one of my many "clients" in ICI. Over the years my efforts have been directed to dealing with ICI people and their affairs and to me so far my name is but another on the list of those for whom some action is required—some, like me, to retire, some to be promoted or transferred and to move their homes, and yet others involved in one or other of the many activities where the Company's policy plays its part. So you can see, I find it odd, to say the least, to be at the receiving end of "Operation Retirement."*

What does it feel like to retire, you ask, when one has been with the Company from the day it was formed back in 1926? *I was with it before it was formed if it comes to that, as a very junior staff officer in Nobel Industries. I think I could tell you more easily what it felt like then than what it feels like now. In those exciting days about* 1927 *it was for a young man really fine fun. To give you but one example, to meet the demands for office space for the large numbers of people descending on Nobel House from all over the country (from places called Northwich or Runcorn) I had to call on the services of Contractors to build partitions and make alterations, Removers to move furniture, safes, etc., and Suppliers to provide desks, chairs and all types of office gear, not to mention Post Office Staff to fix telephones. But all these needs had to be met within* days *and my efforts depended on them—they knew all about the then recently much publicised "merger" called ICI and happily worked day and night, weekdays and week-ends. The furniture man got his order only on the understanding that the stuff was on the spot tomorrow and in my lordly way I asked for and got, say,* 20 *to* 30 *desks at a time—some of them are still being used in IC House. On more than one occasion, when all the lot were on the job over the weekends, greatly daring and fearful of my expenses claim, I arranged for a barrel of beer to be on hand and this was much appreciated by one and all through the midnight hours. To this day I am grateful to those remarkable men, Contractors, Removers and Post Office Staff, who made the whole effort possible.*

In the very early days the head of the Staff Department was Major General F. J. Duncan, ex-Royal Scots, and for a period he was my boss. He had been all over the world and knew everyone, but was very much the General. Although he had quite a temper when he liked, it quickly dissolved and at heart he was a kindly man, although he and I did not always see eye to eye on staff affairs. It was on one of these occasions that I was brave enough wholly to disagree with some action he had in mind and he thumped the desk and told me that he would no longer listen to such impertinence from a young cub. With an effort I kept silent and stalked out of the room in high dudgeon, although in my heart of hearts I knew I was right. Later on that morning the General strode into my room and said "Inglis, I have come to apologise for being rude to you just now, I was wrong and you were right. You are coming out with me this afternoon to play golf, and that's an order." I tried to tell him that there was a good deal of work to do, but I knew it was inevitable and later in the afternoon we departed for his golf course just outside London. My troubles, however, were not yet over because General Duncan, although not a very good golfer, liked to win, and on one or two of the few occasions when I was playing better than usual I had to watch it at about the 16th or 17th hole. On that particular occasion, however, I had no qualms whatever—it was with joy and pleasure that I won!

Over the years I have interviewed and engaged many staff. Interviewing and testing candidates used to be much simpler then than it is today. It had to be simple because I always had to be sure I knew the answers to any of the questions I asked; in fact after giving answers to a few simple mental arithmetic sums (I had worked out the answers on paper beforehand) any candidate who gave me the correct answer to the question "What was the colour of Queen Elizabeth I's wedding dress?" was home and dry. Lest anyone should think these tests insufficient, I might add that several who passed them now occupy high office in ICI. Sometimes a father came with his son to the interview but I stopped that after the occasion when the poor wretch, on each occasion when he fumbled over an answer to a question, was told by his father of the fearful thrashings he would get on return to the happy home. I felt so sorry for him and his doleful fate that I seem to remember I engaged him willy-nilly on the spot.

You may like to know that I was nicely diddled by a young man who applied for a job. He seemed to me to have the makings of a good accounts clerk and so I sent him to the Chief Accountant who had a vacancy. He was accepted and on his return I told him of this and offered him the job—would he accept? He would. Would he be willing to start on Monday? He would. He shook me warmly by the hand and just before he left said with some embarrassment that he was short of his railway fare home, some 3s. 6d., and could I lend it to him, to be repaid on the Monday. Heaven help me, I gave him the money and he departed, never to return.

If I remember correctly, and excluding the present Personnel Director, I have served under nine Directors, all of whom at one time or another were responsible to the Board for Personnel affairs: Henry Mond, H. J. Mitchell, J. H. Wadsworth, H. O. Smith, B. E. Todhunter, F. W. Bain, J. L. Steel, C. J. T. Cronshaw and R. A. Banks.

My path in ICI has been a happy one. I like people, and people have been my job. It has provided me with few heartaches and an abundance of interest and pleasure. By and large ICI has been and still is populated with able and agreeable people, albeit all different in thought and deed. Am I sad at leaving? Of course I am. But we all have to go at some time; good luck to you and the Magazine.

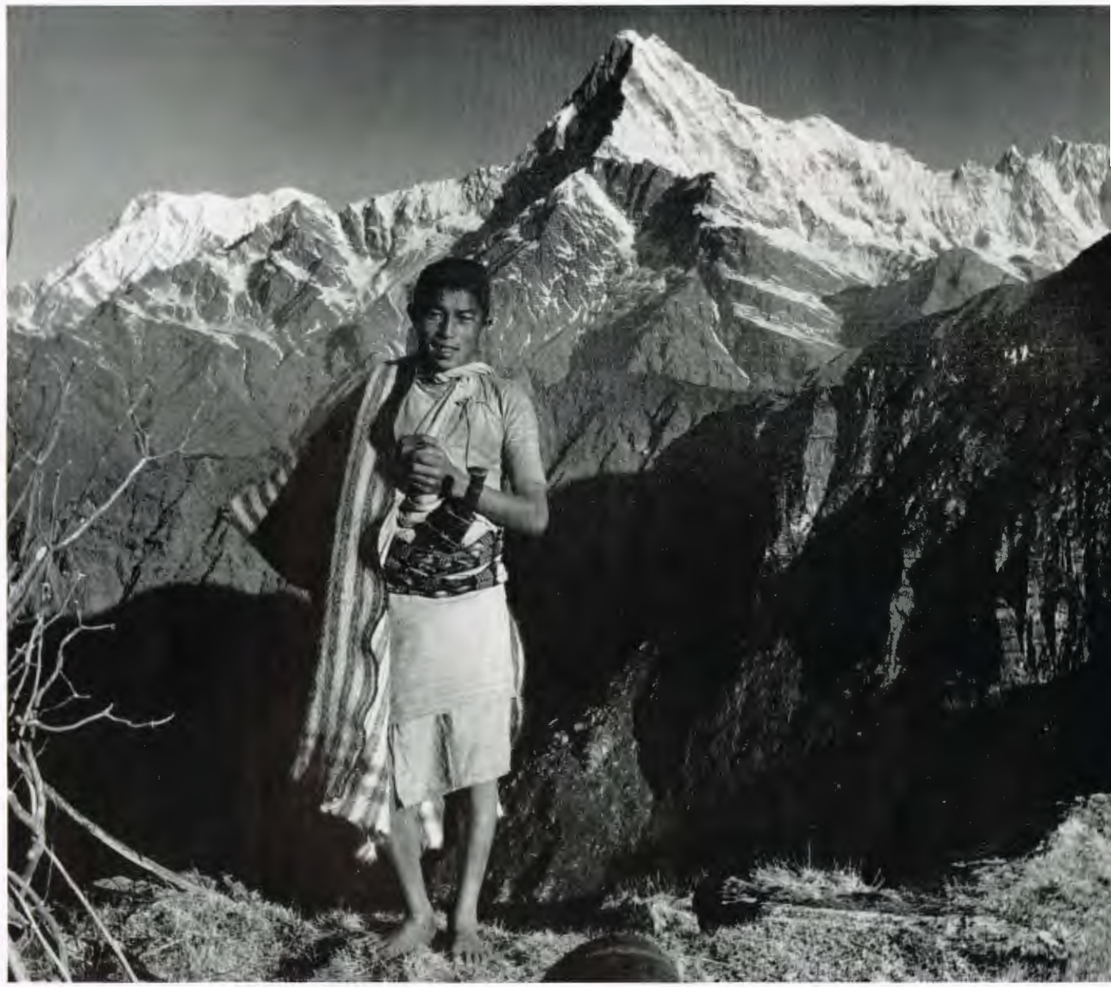
Yours sincerely,

Basil Goodfellow has long enjoyed a well-deserved reputation both as mountaineer and amateur photographer. To mark his retirement from the Company the Editor invited him to select a few of his favourites from his own photographs for publication in the Magazine.

The best of GOODFELLOW

Kaçkar Dag (12,920 ft.). First British ascent
On my Sabbatical leave in 1963 I went with friends to the Pontic Alps, which lie inland from the Black Sea, close to the frontier of Soviet Georgia. These mountains have been very rarely visited by mountaineers and never previously by a British party. We ascended the highest peak on our first expedition and intended to plant the Union Jack on the summit, but we had been warned that the Turks object strongly to foreign flags on their territory. So we displayed it as this photograph shows.

Off Cowes
Sailing as a sport is for me second to mountaineering, and I am fortunate to have a friend with a yacht big enough to need a crew. This photograph is typical of many taken during agreeable weekends spent with him.



Overseas affairs have occupied most of my working years with ICI and have satisfied much of my interest in foreign places and foreign peoples. I have spent one-third of my time travelling abroad or living overseas. Much of my foreign travel was in the days before aircraft, when one really saw the countries. Most of my residence overseas was in Asia, with three years in China for ICI and four war years on military service in the Far East and India.

Mountains have been my passion since boyhood. British hills have occupied innumerable weekends; I have made thirty-five visits to the Alps and other mountains of Europe, and I have managed to see and often climb the mountains in four other continents where my travels have taken me.

Most of my photography has been aimed to provide a diary of agreeable days in journeying and mountaineering. Naturally I have accumulated a very large collection, and these few are taken from those which, over the years, have continued to give me the greatest pleasure.

B.R.G.

Nepalese shepherd
In 1953 I had occasion to visit India and took my annual holiday while I was there. Nepal had just been opened up to foreigners, and my friend and I were the first Europeans to visit a mountain district in the centre of the country. Our objective was to approach close to a peak called Macha Puchare, one of the most spectacular mountains in the world, 23,000 ft. in height. This is the mountain in the photograph, and friends of mine, seeing my photographs when I returned, were able to plan an expedition to it and got to within 100 ft. of the summit by the right-hand skyline ridge in this picture.

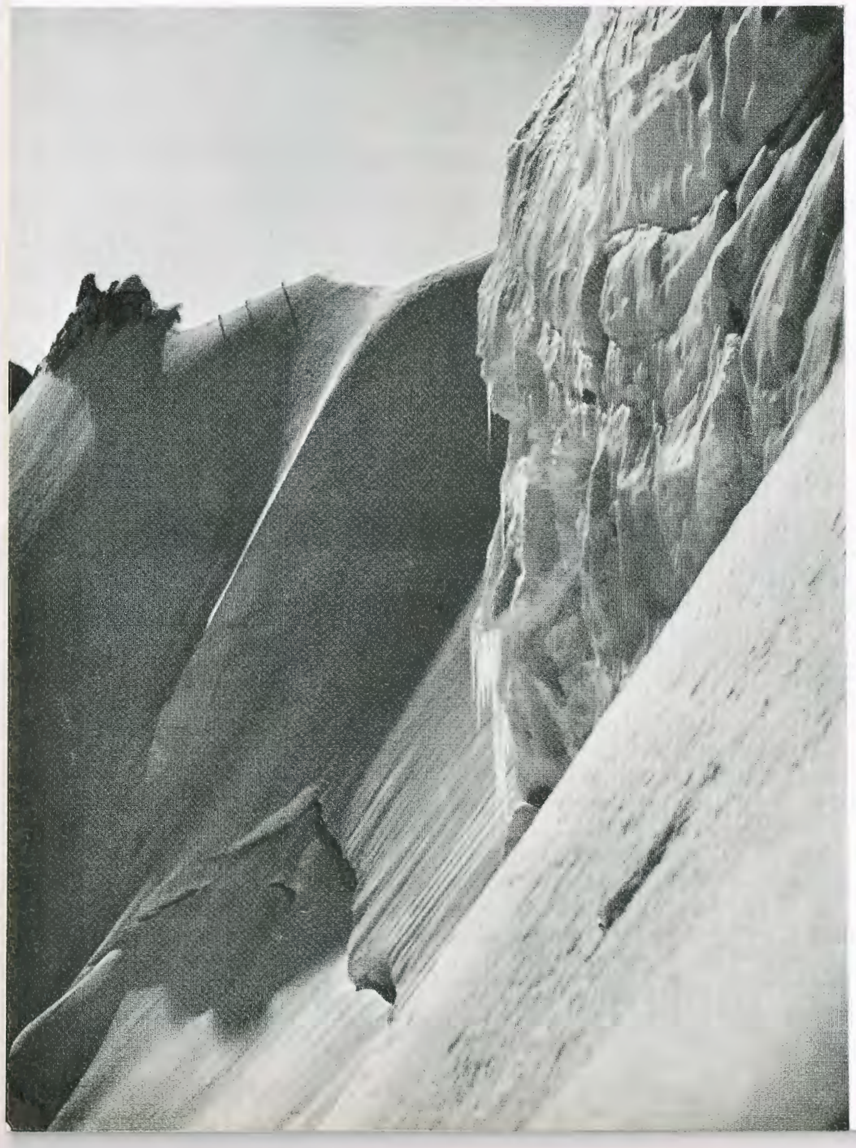
Turkish window-box
Last year I took my leave in the Pontic Alps of north-east Turkey, climbing in mountains which have been very little visited by climbers. Like other mountain peoples, the Turkish inhabitants move up in the summer to temporary villages to pasture their cattle as the snow recedes from the alpine meadows. This group of Turkish children showed special interest in us, for they can rarely have seen English travellers before.

Three men on a ridge
My friends consider this to be my best mountain photograph. It is a typically dramatic scene of Alpine mountaineering taken while two of us were climbing the Ober-Gaberhorn while a party of three on the skyline climbed another ridge to meet us at the summit.

End of winter, Spanish Pyrenees
On the Spanish side of the Central Pyrenees is a group of granite mountains set with pine forests and with hundreds of lakes. It is one of the most beautiful mountain areas of Europe. Although we were there in the middle of June, the winter had scarcely left the high mountains.

A view of the Matterhorn
In 1957 we made our second attempt to climb the Dent d'Hérens by the difficult ice route up the north-west face. The second attempt also failed. The beauty of the ice scenery and this unusual view of the Matterhorn afforded some compensation for a day which would otherwise have been wasted.

Children at prayer, Rangoon (back cover):
Everyone who goes to Rangoon must visit the great Shwe Dagon Pagoda, probably the biggest Buddhist monument in the world. This photograph was taken in one of the many lesser shrines round the base of the great Pagoda, where the charming Burmese children come to make their early morning devotions.



Temples of the Dawn

by John C. Lewes Sayer

John C. Lewes Sayer has been working for the last year in the Development Department of Plastics Division. He recently undertook a two months' trip up the Nile to the Egyptian temples of Abu Simbel. His reason for visiting these temples was a most unusual one, being, in fact, a wish to explore a theory of his own which would link the ancient Nile temples with Stonehenge in a common expression of a primitive religious impulse.

On Salisbury Plain stands a ring of massive stone arches erected some three to four thousand years ago in the image of the sun and used for a form of primeval sun worship. We call this phenomenon Stonehenge. People who have visited it are unanimous in their agreement about one thing—it is a place full of the most powerful "atmosphere," a strange, alien, introspective image of a bygone people.

One feels "atmosphere" as an emotional effect triggered by a particular combination of circumstances.

Working on the fact that many people describe the effect of Stonehenge as a feeling of being watched, I supposed that the subconscious mind creates the figures of the Neolithic inhabitants in the imagination. Since our subconscious could know no exact features of ancient man it could merely imagine him as a human form.

The root of the problem was to find what it was that imparted the original effect to those great stone arches thousands of years ago, giving them the ability to produce their eerie impressions today.

The Abu Simbel expedition in the desert

To investigate further, I felt it was necessary to find some real figures in a similar monument. Naturally I could not find the original men; but the next best thing was to find their own images of themselves, and these I knew could be found in the part of Africa known as the Land of Kush in ancient Nubia. At the temples of Abu Simbel on the Nile there are massive stone figures over 60 ft. high, carved at the same time as Stonehenge, and built to the sun god. So I went there in September last year.

Abu Simbel proved to be exactly what I wanted and more. It was immediately evident that both it and Stonehenge were created by men of similar character and thought. Identical thinking occasioned their construction, only environment occasioned their differences. Both had required a prodigious human effort in their building, and both are immortal symbols of Ancient Man.

Other thoughts are posed by the two temples. Stonehenge is built in the image of the sun, it is in fact a time base for worship of the sun, and a calendar, therefore, is a prerequisite of its construction. Now the only people who had a calendar four thousand years ago were the Egyptians, who built Abu Simbel, and we are faced with the idea of Egyptian intercourse with Northern Europe in Neolithic times. Casting around for support for this theory it is, in fact, possible to see a trend in temple worship of that time from Egypt to the Scandinavian hills. In the Mediterranean area temples are complex and ornate, and they all possess images of the gods to whom they are built. In other words, the worshipper's relationship with his god demanded a physical image of the god to make communication between them possible. As you proceed northward, the images and statues in the temples disappear, so that the god–worshipper relationship no longer demands a physical form for the god. He has become more abstract and omnipresent and therefore closer to the people. In temples like Stonehenge in Britain and those in northern France we find no statues at all —only the massively constructed shrines which are themselves sufficient for communion between god and man. Further north, in Scandinavia, even the shrines disappear and the gods inhabit the mountains and forests. Nature herself is sufficiently powerful to act as the vehicle for religion. It may be argued that this is a trend towards the more primitive, towards the less well developed and the less intelligent, but there is evidence to suggest that the religions of these differing people were equally developed in doctrine and beliefs. It seems to be the case that man in northern Europe was as intelligent as his Egyptian counterpart four thousand years ago and differed from him only in his environment. Climatic and other conditions were so much easier in Egypt than in Britain that the affluence of nature was reflected in what we would call the living standards of its people.

Were we to IQ test an average Neolithic man I think we would give him the same rating as an average man of today, but he would be a very different type of man. To him everything would have had a spirit, and the spirit part of things at least as important as the material part. He would find our lives and world incredibly dull and insensitive. He would wonder why we could not see, hear and feel the spirits of everything, as he did—it would be rather like a husband trying to explain marriage to a man who had never seen a woman. There is an enormous language difficulty in describing primitive man. We have only the words to describe things tangible to ourselves, and so when we describe what we feel to be the truth about ancient man we do so in our own terms.

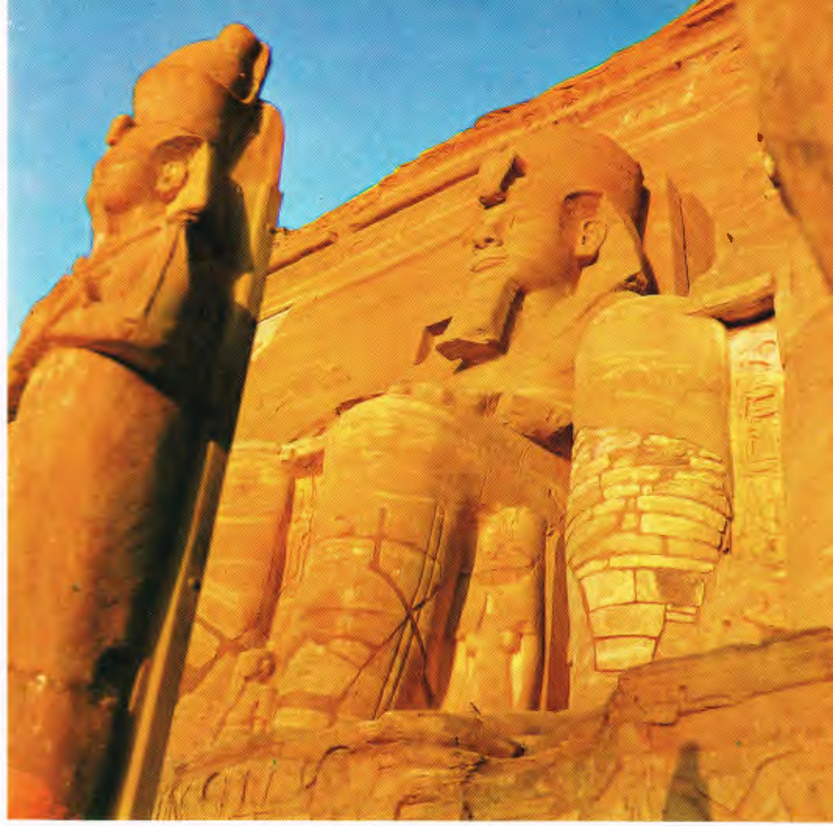
Abu Simbel is a prime example of this. As the sun rises, sending its silver beams racing across the desert sand, so the dark shapes on the west bank of the Nile suddenly come to life. The massive statues of Rameses are revealed sitting quietly gigantic, gazing gently yet imperially out over the river. By their feet stand the figures of their children; on either side are their favourite animals. The figures are alive and vital, their expressions are full of confidence and, though relaxed, seem alert. We feel like ants scrabbling at the feet of kings, we must be careful not to offend these ancient desert gods. Inside the temple the atmosphere is even more intense—massive figures wait silently on either side, and in the dim light at the far end of the chancel two seated figures seem almost to glow at us. Rameses and his wife are waiting for a sacrifice. They seem as if they will get up and speak at any moment, as if the horses will stamp in the sand and snort, the slaves hurry to their tasks, the soldiers seize and bind us. We shiver.

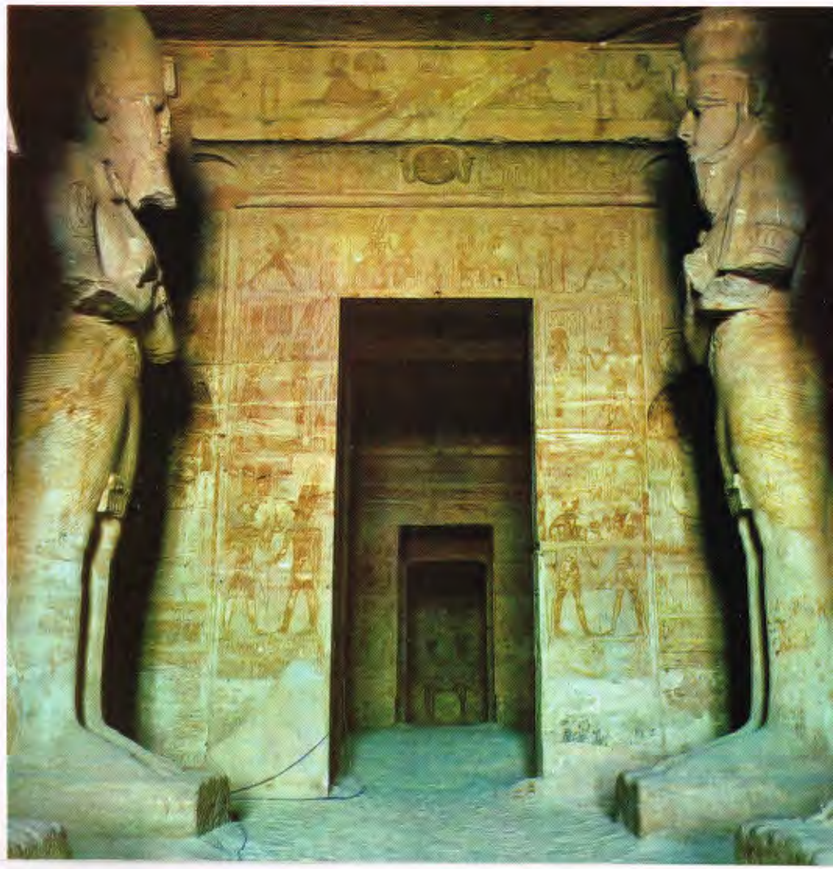
Such is Abu Simbel, but the difference between my description and that of an ancient Egyptian's would be that to him the figures really would have been alive—stiff and paralysed in the stone but alive in the spirit. So much so, that to him the spirits would be as powerful as ever they were in their human bodies, and to be revered as ever they were in life, being in death immortal. A Neolithic man's respectful dread of these statues would be unlike ours, which is strictly emotional. To them our world of scientific fact would be as meaningless and intangible and ineffectual as their world is to us.

Right: Enthroned figure of Rameses

Below: The Sanctuary, the Ramesseum, Luxor

Below, right: Entrance to the tomb, Abu Simbel





CHILDREN AT PRAYER, RANGOON *by B. R. Goodfellow*